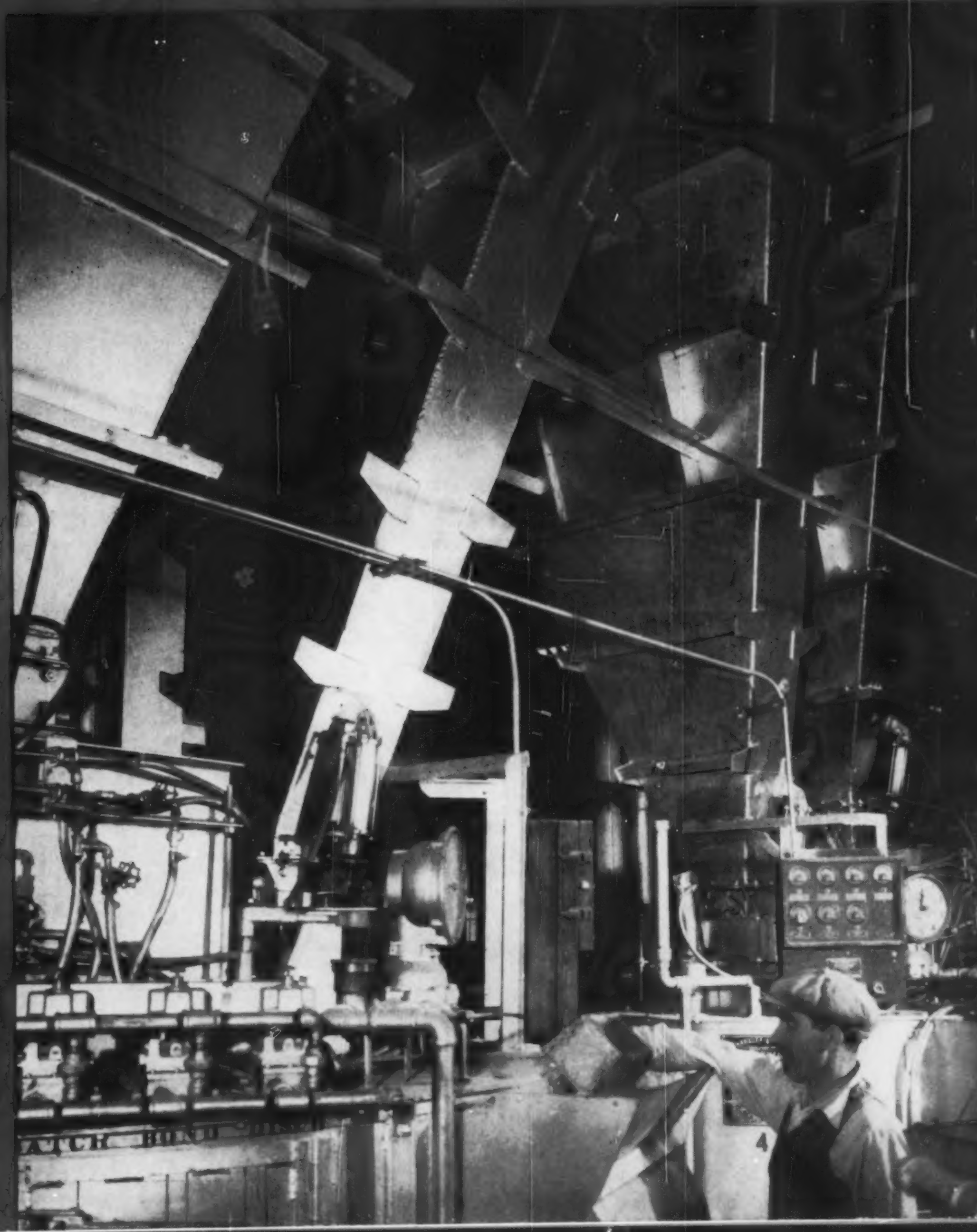
American Foundryman

DECEMBER
1954



The Foundrymen's Own Magazine

American Foundryman

Volume 26 *December 1954* *Number 6*

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In This Issue . . .

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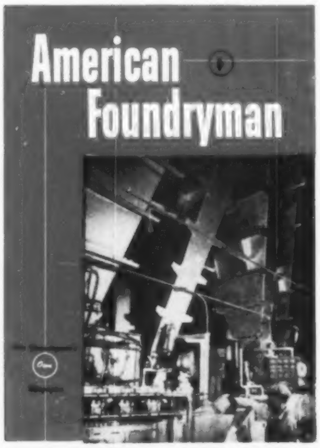


Huge chutes and the mixers to which they supply sand are part of the new sand system, one of the principal features of a $4,000,000 modernization program recently completed at the Longue Pointe foundry of Canadian Car & Foundry Co. Ltd., Montreal.

Published monthly by the American Foundrymen's Society, Inc., Golf & Wolf Roads, Des Plaines, Ill. Subscription price in the U.S., Canada and Mexico $3.00 per year; elsewhere, $6.00. Single Copies 50c. May and June issues $1.00. Entered as Second Class Matter under Act of March 3, 1879, at the Post Office, Chicago. Additional entry at Des Plaines, Ill.

Why the ALLIS-CHALMERS 2-yd HD-9G is a

Bigger Value for Bigger Jobs

If your production demands are large enough to keep an Allis-Chalmers HD-9G Tractor Shovel busy, you will find it is your top value in terms of work capacity per dollar invested. Actual tests by users show that in many cases this 2-yd tractor shovel will do up to three times as much work as a 1-yd machine. For example, the Doetsch Brothers, Evanston, Illinois, contractors, found that their HD-9G could fill a 10-yd truck in two minutes while it took their 1-yd machine five minutes to do the same job.

In addition to large bucket capacity, the HD-9G has the power, traction and reach to handle jobs that smaller machines could not do. Its 72 drawbar hp, 29,900-lb weight and 11-ft, 9-in. dumping height mean big work capacity from every angle.

Just as important as its work ability is its "keep working" ability. Full-length box-A main frame relieves all working stress on engine, clutches and transmission. Truck wheels, idlers and support rollers require lubrication only once every 1,000 hours. Crawler tracks stand up in cullet and other sharp, abrasive material as only steel can.

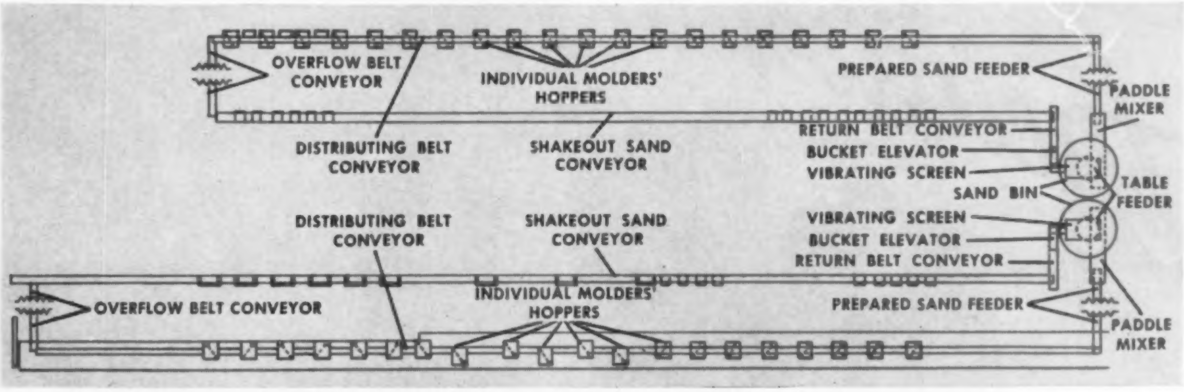
Write for literature or ask your Allis-Chalmers dealer to show you the HD-9G in action.

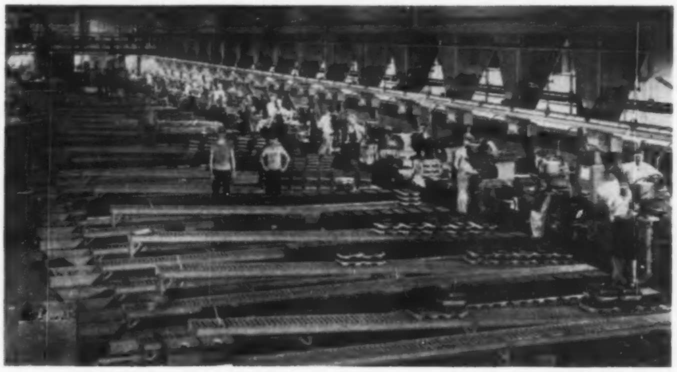
ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

For more data, circle No. 766 on postage-free Reader Service card on p. 17 or 18

Now 3 Crouse-Hinds foundries are LINK-BELT mechanized





▲ At squeeze molding side of Crouse-Hinds' Syracuse aluminum foundry, sand travels on Link-Belt distributing belt conveyor over molders' hoppers. Overflow sand is carried on Link-Belt cross belt conveyor in background to shakeout belt conveyor, which is also fed by hoppers at foot ends of roller conveyors.

Link-Belt equipment on sand preparation floor includes storage tank, revolving plate feeder, double paddle mixer and inclined belt conveyor delivering to distributing belt conveyor. Operation involves two similar systems, each feeding 20 molders' hoppers at a capacity of 35 tph of prepared sand. ▶

New Syracuse aluminum foundry gets modern sand handling system

LINK-BELT mechanization reduces unit costs . . . speeds production . . . betters working conditions. And Crouse-Hinds has proved it — *three times since 1928.* The most recent installation — in their Syracuse aluminum foundry — provides low-cost sand handling. Sand is moved mechanically through preparation, molding, shakeout and reconditioning.

If your castings output is limited by an outdated handling system, Link-Belt mechanization is the answer. Your foundry may be large or small — gray iron, steel, malleable or non-ferrous. Whatever your requirements, Link-Belt equipment and proved engineering practices can cut your operating costs . . . conserve manpower for more exacting jobs. Our foundry specialists will pool their experience and judgment with yours and your consultants' to provide smooth coordination between operations . . . boost production in present floor space. And it all begins with a call to your nearby Link-Belt office.

13,654

LINK-BELT

CONVEYORS AND PREPARATION MACHINERY

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

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Each of these machining departments have a wide variety of modern equipment to handle almost any type of work that you might need. You'll find City Pattern Foundry and Machine Company an interested and economical source for both short and long runs.

In the foundry department you will find one of the most versatile and modern layouts in this part of the country. And, every conceivable laboratory control and testing device is on hand to insure chemical and physical specifications.

We will welcome the opportunity to give you more detailed information . . . won't you drop us a line or call in your specific requirements?

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Products & Processes

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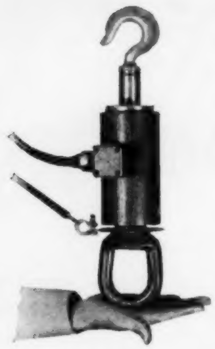
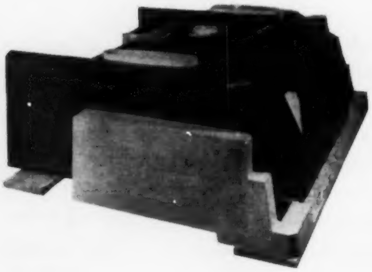


▲ Crane Scales

Three new standard sizes of SR-4 Crane Scales in small capacities have been announced. New sizes are ½-ton, (shown above), 1¼-ton and 2½-ton. Other sizes available are 5-ton, 12½-ton and 25-ton. Rugged direct-reading load indicating instruments may be mounted in crane cabs, on carts, or in stationary positions. Cable reels provide freedom of movement of crane scales. High overload capacity protects calibration of the load-sensitive units. *Baldwin-Lima-Hamilton Corp.*

For more data, circle No. 696 on p. 17



▲ Corisa Lumber

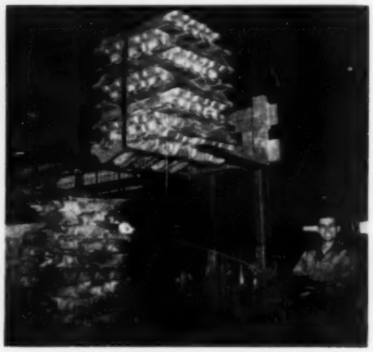
Corisa lumber, native to South America is now being distributed in the United States and is being made available to pattern shops where its use is bringing new economies to the pattern-making trade. Corisa wood is somewhat lighter than pine, but equally as strong. Being free from pitch it holds its shape much better than pine, remaining dimensionally stable under adverse conditions even in thin-shelled sections, it is pointed out. It is available in 1, 1¼, 1½, 2, 2½ and 3 in. thicknesses. *Kindt-Collins Co.*

For more data, circle No. 697 on p. 17

▼ Interlocking Ingots

New interlocking aluminum ingot, just placed on the market, is claimed to overcome the problem of unloading shipments. Interlocking ingot can be handled without pallets, and can be double or triple stacked safely and easily. Ingots' greater surface area makes them melt faster, with less gas, it is claimed. Also, a smoother top surface eliminates chances of trapped moisture and dirt. The new product is available either as primary or casting alloy ingots. *Reynolds Metals Co.*

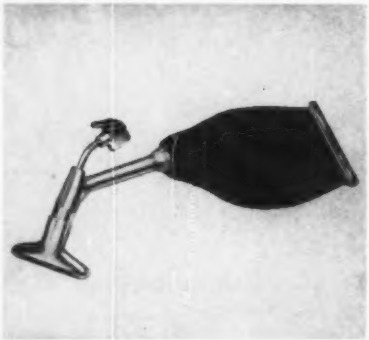
For more data, circle No. 698 on p. 17



▼ Swing Riddle

New special purpose riddle, the Swing Riddle, for use in conjunction with all types of molding machines has been introduced. Unit is mounted on a rugged steel base and in operation is positioned alongside a molding machine. To riddle a layer of sand unto the pattern, the machine operator need only to swing the riddle into position over the pattern. A limit switch starts the riddling action and ends it automatically when the operator swings the riddle away from the pattern. *Beardsley & Piper.*

For more data, circle No. 699 on p. 17



▲ Air Line Vacuum Cleaner

It is now possible to convert any air line into a powerful vacuum cleaner for either wet or dry pick-up with the Bennett Industrial Air-Operated Cleaner. The Bennett picks up the smallest particles of lint, waste, hair, filings, lathe cuttings, etc. and deposits them into an easily emptied container. It can also be connected to larger waste collecting installations. Weighing less than 1½ lb, the Bennett is easy to handle. *Merchandising & Manufacturing Associates, Inc.*

For more data, circle No. 700 on p. 17

▲ Magnesium Chip Extinguisher

New M-X Magnesium Chip Fire Extinguisher, the first extinguisher to employ a liquid as an extinguishing agent, has been announced. Liquid agent is non-toxic, non-corrosive, non-abrasive, will not freeze and is a non-conductor. It does not produce excessive smoke or irritating fumes when in operation and leaves magnesium fires cool enough to handle. Available in two quart and 2½ gallon capacities. Units can be pressurized with air or nitrogen. *Buffalo Fire Appliance Corp.*

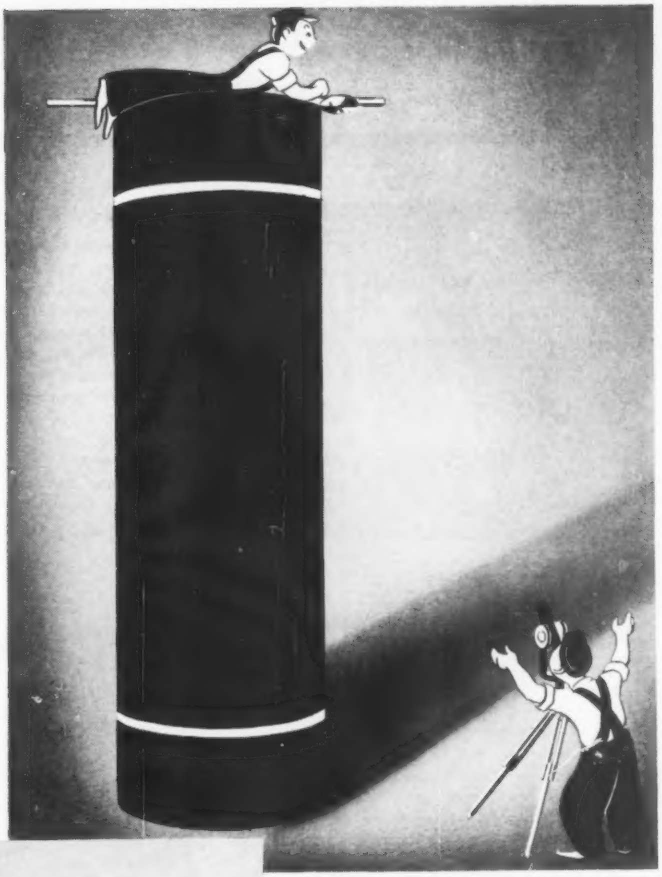
For more data, circle No. 701 on p. 17

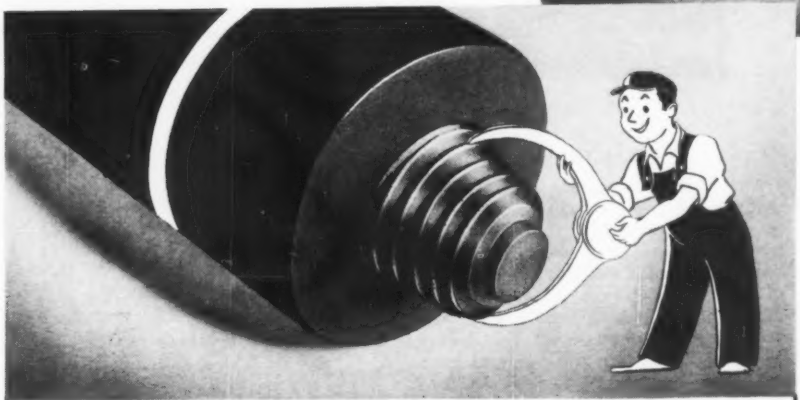
continued on page 12

Want greater Electrode Savings?

Take these tips from

NATIONAL CARBON





LOOK AT ELECTRODE LENGTH. Frequently we are able to direct customers to valuable economies in cost-per-pound of electrode, as well as to other cost-saving advantages, simply by recommending a longer length than they are already using. For instance, when you switch from a 60" electrode to one of 72", you reduce the number of electrodes, handled and used, by *one in six*, and, even more important, you cut down the number of joints made by the same high percentage. Obviously, this increases furnace-availability and boosts production.

LOOK AT NIPPLE SIZE. Electrode nipples are another potential source of economy and improved performance. For example, if you use electrodes of 16" diameter or larger, and you are not already using the smaller nipples *pioneered by* National Carbon Company, you may be able to make this switch and save money while getting even stronger joints due to the thicker socket-walls provided by the smaller nipple sizes.

• These are only two of many ways that National Carbon's electrode technical-service facilities have helped users get the most for their electrode dollar. Let your National Carbon representative survey your electrode and nipple requirements. He may help you get substantial savings and improved electrode performance.

FOR ELECTRODES AND ELECTRODE SERVICE...rely on NATIONAL CARBON COMPANY!

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Products & Processes

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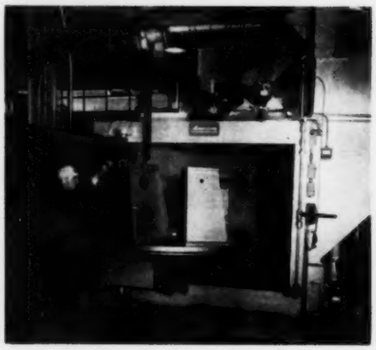
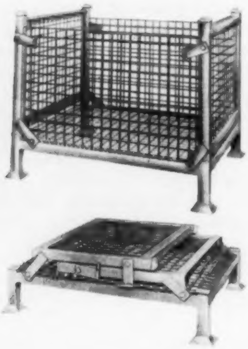


▲ Blast Cleaner

New kind of table-type airless blasting machine for various cleaning and peening applications has been announced. Machine, called a 72 in. Wheelabrator Swing Table, is distinct from other swing-table-type airless blasting machines in that it requires no pit at all for the abrasive hopper. The whole machine is built for floor level installation. Most important feature of the machine is the 72 in. diameter plain work table which is mounted on the door. *American Wheelabrator & Equipment Corp.*

For more data, circle No. 702 on p. 17



▲ Folding Pyramid Box

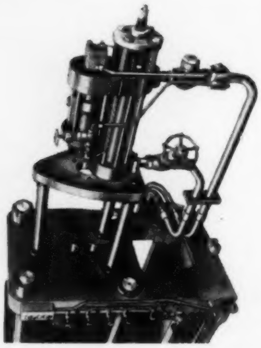
Greater economy in materials handling is now possible with the new all steel, folding Pyramid Box, a heavy duty knock-down shipping container. New container combines the structural strength of the steel tubular rack with all the desirable features of the wire mesh container. Nesting Pyramid's design permits tiering when loaded; and when empty the container folds down to a compact unit which also nests in an interlocking position. Each folded unit stands 15¾ in. high. *Paltier Corp.*

For more data, circle No. 703 on p. 17

▼ Shot Pressure Intensifier

New Shot Pressure Intensifier is now being offered as optional equipment on Cast-Master Die Casting Machines. Intensifier is engineered to operate without the use of time-consuming valves, permitting a simultaneous build up from the normal line pressure to intensified pressure without hesitation. Use of the new equipment, it is claimed, result in denser castings, having a much finer molecular structure with a better surface finish. Can be applied to cold chamber model. *Cast-Master, Inc.*

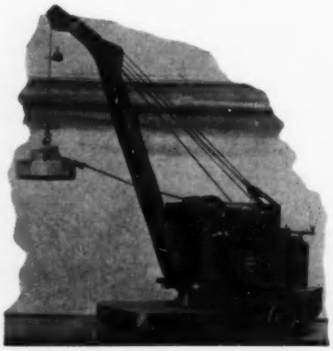
For more data, circle No. 704 on p. 17

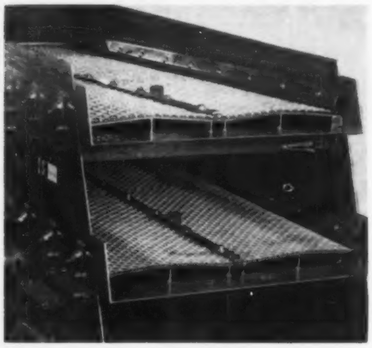


▼ Crane Truck

Designed for transporting long, hard-to-manage loads in confined areas, and to reach into normally inaccessible areas, the 6000 lb-capacity crane truck has been developed. Crane has a travel speed of four mph without a load, and 3½ mph with full load. Hoist speeds: Up, without load—28fpm, with full load—14 fpm; Down, with load—15 fpm, with full load—26 fpm. Crane is designed with a slewing action to facilitate handling on either side of the travel area. *Elwell-Parker Electric Co.*

For more data, circle No. 705 on p. 17

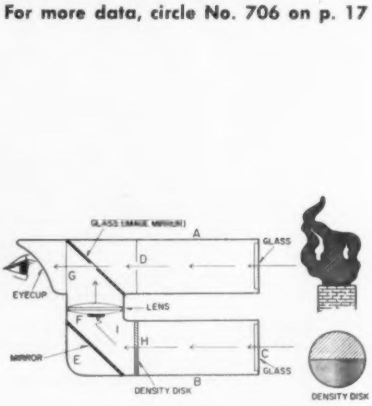




▲ Deck Screen

The W-deck screen is now available on all Simplicity Gyrating Screens. Screen permits a more even flow of material across the screen surface. This results in more screening area utilized, thus better screening of materials is obtained and screen life is increased by even wear. This W-deck features side and center tension take-up only. Maximum opening utilized on the W-deck screen is two inches, with maximum wire size ⅜ in. *Simplicity Engineering Co.*

For more data, circle No. 706 on p. 17



▲ Smoke Control Instrument

New instrument to aid in compliance with smoke control laws has been made available. Called the MSA Smokescope, it can be used to determine whether or not fuel is being properly burned to gain full BTU advantage. In this respect, industry can put the Smokescope to work for greater efficiency in addition to improving its community relations. With the Smokescope, observers are able to view a standard reference disk, shaded to correspond with degrees of smoke density. *Mine Safety Appliances Co.*

For more data, circle No. 707 on p. 17

continued on page 17

RESINOX

for shell molding... your key to cost and quality control!

It's a fact that shell molding can give you castings with more uniform quality, better finish, lower reject rate and closer tolerances than the green sand method.

But, there are important differences in shell molding resins. No one resin can meet all foundry molding requirements—that's why Monsanto research has developed three different resins to meet special foundry needs:

RESINOX 714—For fastest pick-up and fastest curing cycle.

RESINOX 736 – A general all-purpose resin for fast pick-up, high rigidity and strength.

RESINOX 1128 – For deep-draw problems; produces shells of high rigidity and superior strength. Specifically developed to meet a wide range of varying shop conditions and casting problems.

Today, the progress is toward resins which show high rates of pick-up and cure without any sacrifice in other desirable properties, such as good hot strength and even cure. That's why the nation's leading foundries specify Monsanto's Resinox shell molding resins – they're research-proved and shop-tested.

Continuing technical research in Monsanto's laboratories promises still further improvements in foundry resins. For the *latest* data on resin products and processes for the foundry industry, write MONSANTO CHEMICAL COMPANY, Plastics Division, Room 5611, Springfield 2, Mass.

Resinox: Reg. U. S. Pat. Off.

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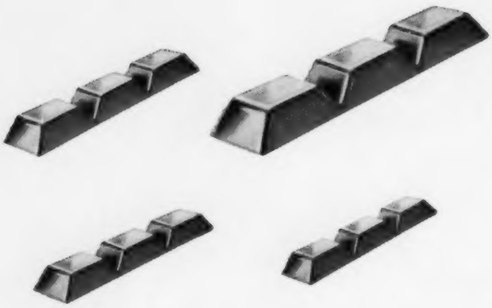

Only the Aluminum Smelting Industry can be relied upon, unfailingly, for

the alloys you need

the variations you want

the quantities you wish

the deliveries you require

the services you should expect

the prompt attention you must have

All these come only as a matter of course from a supplier who looks upon you as his major customer—from the Aluminum Smelting Industry which for over 40 years has proved to be the one constant, reliable source of aluminum alloys for FOUNDRIES.

Today's comfortable overall supply of aluminum does not, in itself, guarantee that foundries' needs for aluminum alloys will remain readily available as a result.

Immense tonnages of aluminum will be consumed in the presently expanding wrought products mills now under way to provide for the increasing requirements for fabricated shapes in the construction, transportation, automotive, communication, and other fields. The increased aluminum production will insure supplies for those rapidly increasing wrought product applications, *but it will not assure the foundry its future aluminum alloy ingot supply.*

For over 40 years supplying foundry alloys has been the Aluminum Smelters major effort—it will continue so in the future.

* * * *

Like to know why the Smelting Industry is uniquely qualified to serve you? A recent article in "Modern Metals" discusses the history and background of the smelting industry—it is a frank discussion of the reasons for a feast and famine aluminum supply. Write for a free copy.

no foundry ever shut down because ingot was not available from smelters!

ASR

Aluminum Smelters Research Institute
20 North Wacker Drive, Chicago 6, Illinois

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Products & Processes

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Fill out postcards on pages 17-18 for complete information on items listed on pages 10-12-17-18-20

Hose Valves

New line of Industrial Rubber covered Hose Valves has been announced. Valves are especially designed for wash down and tank filling applications. Have only two moving parts with no springs or lever mechanisms. Literature on request. *P-K Industries, Inc.*

For more data, circle No. 708 on card

Blow Plate

Short-run core boxes can now be rigged for core blowing by using the new Quick-Change Blow and Vent Plate Assembly developed for use on San-Blo core blowing machines. A plastic blow hole gauge plate is furnished by the manufacturer, along with hand punch and blow sheets. *Federal Foundry Supply Co.*

For more data, circle No. 714 on card

Almuinum Etchant

Granular alkaline-type aluminum etchant reported to provide a rapid, uniform controlled etch on aluminum, and eliminate the troublesome problem of hard sludge build-up on equipment surfaces, has been announced. Additional data is available on request. *Oakite Products, Inc.*

For more data, circle No. 709 on card

Duplicating Unit

New portable device for duplicating on engine lathes has been developed. Copy-Master takes heavy cuts, interrupted cuts and hogging cuts, and works on any lathe of 6 in. to 14 in. swing, regardless of bed length. Descriptive literature is available. *D. C. Caufield Copy-Master.*

For more data, circle No. 715 on card

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Moisture Detector

Delmhorst Detector Model RC-1 is 5 x 8 x 9 in. and weighs only 6½ lb. Meters are self-calibrating. Built-in standards permit user to check calibration easily. Simple adjustments take care of changes in battery-voltage. *Delmhorst Instrument Co.*

For more data, circle No. 710 on card

Portable X-Ray Unit

New type of portable industrial x-ray unit capable of producing a 360 degree radiation sweep, which enables radiographers to attain new highs in inspection efficiency and to greatly reduce the cost of inspection, has been announced. *General Electric Co.*

For more data, circle No. 711 on card

Protective Sleeves

Gortite sleeves, boots, way-protectors and machinery covers are now available. Round, square, rectangular and all combinations are designed to operate in angular, horizontal or vertical positions. Heavy, medium and light materials may go into a single unit. *A & A Mfg. Co.*

For more data, circle No. 712 on card

Power Sander

Heavy-duty, orbital-motion Thor Speed-Sander, featuring full load speed of 550 rpm and a 4½ in. by 9 in. sanding area, is now in production. New sander weighs 7¾ lb, and has an over-all length of 11 in. Offers all ball bearing, direct connected, air cooled motor. *Thor Power Tool Co.*

For more data, circle No. 713 on card

Reader Service Dept. **54|12**

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Golf & Wolf Roads

Des Plaines, Illinois

Free Foundry Information

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Cupola Catalog

Bulletin FY-172 includes new developments in cupola design and manufacture, analyses of various Whiting hot blast systems and complete specifications on its cupolas. Booklet presents the basic advantages of cupola melting. *Whiting Corp.*

For more data, circle No. 716 on card

Old Iron Furnaces

Booklet is now available which describes some old iron furnaces of western Pennsylvania. Photos show the remains of the Valley, Reno, Raymilton, Victory, Horse Creek, Van Buren Slab and Shippen furnaces. Illustrated map shows their locations. *United Oil Mfg. Co.*

For more data, circle No. 718 on card

Impregnation of Castings

Brochure MMC-048 illustrates modern casting impregnation. How method achieves complete impregnation of porous castings is illustrated in photos showing the equipment used in batch immersion for rapid treatment. *American Metaseal Mfg. Corp.*

For more data, circle No. 720 on card

Lyquaface Process

Handbook gives a description of and the procedure for using the Lyquaface Process. Tells what can be expected from it and also gives a summary of advantages. Suggestions for the preparation of Lyquaface sand are also included. *Whitehead Brothers Co.*

For more data, circle No. 717 on card

Melting Bulletin

Bulletin No. J-51, "The Fingerprint of Originality and Dependability," lists name of Grindle district representatives, projects and customers. Complete melting, heat treating, stack gas purifying, and accessory equipment are described. *Grindle Corp.*

For more data, circle No. 719 on card

Foundry Hoods

Bulletin No. 450 describes foundry dust, fume and smoke hoods for shakeouts, pouring stations and mold conveyors. Photos show actual installations as well as diagrams. Hood numbers and standard sizes are also included in the booklet. *B. Schneible Co.*

For more data, circle No. 721 on card

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COMPANY

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CITY AND ZONE

Metal Melting Furnaces

Bulletin No. 103 describes the single burner crucible aluminum furnaces. Describes sizes, versatility, "ladle-out," cover-venting, flexibility, oil and gas use, fuel consumption and standards of furnaces. Diagrams are also included. *Campbell-Hausfeld Co.*

For more data, circle No. 722 on card

Battery Training Manual

Bulletin GB-1599 is a technical training manual on lead-acid storage batteries for electric industrial truck use. Photos, diagrams and tables have been specifically designed to enable users to organize battery maintenance programs. *Gould-National Batteries.*

For more data, circle No. 723 on card

Push-Type Cranes

Bulletin PT-1253 covers push-type cranes for light and heavy duty. Underhung and top running cranes are discussed. Photos show actual installations and table includes crane capacity, span, rail size, wheel load and weight of crane. *Industrial Crane & Hoist Corp.*

For more data, circle No. 724 on p. 18

Refractory Selection

Booklet, prepared mainly as a review of practical refractory problems and their solution, discusses nomenclature generally applied to the various classes and types of granular refractories, outlining their characteristics and properties. *Basic Refractories, Inc.*

For more data, circle No. 725 on p. 18

continued on page 20

For more data, circle No. 767 on postage-free Reader Service card on p. 17 or 18

Free Foundry Information

continued from page 18

Fill out postcards on pages 17-18 for complete information on items listed on pages 10-12-17-18-20

Rotoblast Bulletin

Bulletin No. 225 carries complete specifications and dimensions for all Blastmeter barrels from the 1½ cf to 27 cf size. In addition to illustrating the various features of the unit, bulletin shows how production savings may be realized. *Pangborn Corp.*

For more data, circle No. 726 on p. 18

Aluminized Asbestos

Folder describes new line of aluminized asbestos clothing designed to give extra protection against high temperatures and flames. Polished aluminum surface is said to reflect up to 90 per cent of radiant heat away from the wearer. *Industrial Safety Specialties Co.*

For more data, circle No. 732 on p. 18

Laboratory Furniture

Catalog AK-54 covers general laboratory supplies, research and control equipment, chemical reagents, "Pyres" brand and Kimble glassware, temperature control equipment and chromatographic apparatus and equipment. Features and specifications are listed. *Schaar and Co.*

For more data, circle No. 737 on p. 18

Ductile Iron

Bulletin DI-15 includes illustrations, charts and tables on composition, machinability and mechanical properties as cast and as heat-treated. Reviews the development of this relatively new family of irons. *International Nickel Co.*

For more data, circle No. 727 on p. 18

Induction Melting

Bulletin 60 describes the new Inducto line of high frequency induction melting and heating equipment. Featured are two melting charts which simplify the selection of the proper size unit. Also lists applications for which Inducto equipment is suitable. *Inductotherm Corp.*

For more data, circle No. 733 on p. 18

Spray Booths

Bulletin No. 66 pictures and diagrams water wash and dry spray booths. Specifications listing model, dimensions, exhaust fan, filters and weight are also included. Construction features and other available bulletins on other equipment are shown. *Dexpatch Oven Co.*

For more data, circle No. 738 on p. 18

Hydraulic Crane

Bulletin AD-2253 describes the indoor-outdoor Hydraulic Crane. Includes specifications and performance data, also diagrams on working ranges, manual boom extensions and minimum aisle widths for turns. Attachments are also included. *Austin-Western Co.*

For more data, circle No. 728 on p. 18

FREE TEAR SHEETS

of all AMERICAN FOUNDRYMAN articles are available on request. Keep your magazine intact and pass it on for others to use. For free tear sheets, write to Editor, AMERICAN FOUNDRYMAN, Golf & Wolf Roads, Des Plaines, Ill. Please show company connection and your title on tear sheet request.

Scale Models

Booklet K discusses scale models, their application and manufacture. Illustrates a number of models produced by the Johnson Company in metal, wood and plastic—ranging from broad, stylized work to finely detailed construction. *Arthur B. Johnson & Co.*

For more data, circle No. 739 on p. 18

Air Powered Vises

Brochure 4V-654NE5 discusses the many time saving applications of the Air Powered Vises in production holding and pressing jobs. Includes many illustrations and also discusses safety and the elimination of operator fatigue with increased production. *Van Products Company.*

For more data, circle No. 729 on p. 18

Conversion Table

Calendar-type folder lists decimal shrinkage conversion table on 1/16, 1/10, ⅛, 9/64, 5/32, 3/16 and ¼ in. per ft. Also describes new Eterna Metal claimed to possess unusual wear-resistant qualities. It is a heat-treated alloy. *City Pattern Foundry and Machine Co.*

For more data, circle No. 734 on p. 18

Beryllium Casting Ingots

Bulletin No. 3 presents general information on beryllium-copper, beryllium-nickel, beryllium-aluminum and beryllium-iron alloys available in ingot form for remelting purposes. Includes tabular data on composition and properties. *Penn Precision Products, Inc.*

For more data, circle No. 740 on p. 18

Hook Scale

Bulletin M-25 describes Martin-Decker's SU-20 Sensater, a new kind of friction-free hydraulic hook scale that is made in models with capacities up to 20000 lb, yet has a small headroom loss and is light enough to be easily handled by one man. *Martin-Decker Corp.*

For more data, circle No. 730 on p. 18

Propeller Fans

Catalog No. 151 shows entire line of ILG Propeller Fans, arranged to make it easy to select the fan that is right for each installation. Data on operation, performance and installation specifications are also included in the booklet. *ILG Electric Ventilating Co.*

For more data, circle No. 735 on p. 18

Human Relations Quotient

Booklet contains a 20-question self-quiz for supervisors. "Yes" or "no" answers to the 20 questions of the self-quiz will enable supervisors to determine their Human Relations Quotient. Booklet also contains the 12-point Supervisor's Creed. *Kelly-Read & Co.*

For more data, circle No. 741 on p. 18

Informational Brochure

Brochure, "This Is Blaw-Knox," contains illustrated material on all major departmental operations in the company's 11 divisions. Chief emphasis is placed upon products and services and their industrial applications. Includes complete listing of available catalogs. *Blaw-Knox Co.*

For more data, circle No. 731 on p. 18

Electric Trucks

Booklet describes and illustrates Yale electric trucks in capacities ranging from 1000 to 100,000 lb. Cut-away photographs and diagrams show the outstanding features of the trucks. Specification sheet provides full data on performance. *Yale & Towne Mfg. Co.*

For more data, circle No. 736 on p. 18

Core Oils

Booklet, "Facts About the Linoil 700 Series," is now available. Binding strength with reference to the type of sand used is discussed. Baking temperature and cereal flours in conjuction with Linoil 700 Oils are also explained. *Archer-Daniels-Midland Co., Foundry Products Div.*

For more data, circle No. 742 on p. 18

For more data, circle No. 777 on postage-free Reader Service card on p. 17 or 18

Letters to the Editor

Letters should be addressed to *American Foundryman*, Golf & Wolf Roads, Des Plaines, Ill. Letters must be signed but will be published without signature on request.

Plastic Impregnated Mahogany

We are very interested in the plastic impregnated mahogany mentioned in the "Talk of the Industry" section of the October issue of the AMERICAN FOUNDRYMAN, (page 33). We would appreciate it very much if you could furnish us with the name of the manufacturer of this product.

NATHAN GUARINO, *Vice-President*
Dee Brass Foundry, Inc.
Houston, Texas

I read in your magazine for October the item in "Talk of the Industry" on plastic impregnated mahogany. Your article states that it can be used for shell mold patterns; this is very interesting, and we certainly want to look into it.

JAMES T. DORIGAN, *Asst. Purch. Agt.* Electric Steel Foundry Co.
Portland, Ore.

In the October issue of the AMERICAN FOUNDRYMAN in the first paragraph in "Talk of the Industry," reference is made to plastic impregnated mahogany. I would appreciate it if you would advise where I can obtain more information.

A. E. PFEIFFER, *Pattern Dept.*
Allis-Chalmers Manufacturing Co.
Milwaukee

We would like to have more information on the plastic impregnated mahogany for shell mold patterns mentioned in your "Talk of the Industry" section of the October issue of AMERICAN FOUNDRYMAN.

CURTIS W. ROSE, *Sales Manager*
Zenith Pattern Products, Inc.
Dayton, Ohio

Kindly advise the writer where information can be obtained on plastic impregnated mahogany mentioned in your October issue.

M. R. ANSTICE, *President*
Anstice Co., Inc.
Rochester, N. Y.

Having read with interest a brief story on plastic impregnated mahogany being used for shell mold patterns, we would appreciate your sending us complete information on this together with any photographs which you may have for release.

Bernard W. Powell
George W. Rhine Consultants
Greenwich, Conn.

In the October issue of the AMERICAN FOUNDRYMAN we note that there is a plastic impregnated mahogany available for use in shell mold patterns. Please advise us as to where we can get more information.

K. E. DEXHEIMER, *Purch. Agent*
Brillion Iron Works, Inc.
Brillion, Wis.

The material referred to is a plastic impregnated Honduras mahogany developed over a period of some 15 years by the U.S. Forest Products Laboratory, Madison, Wis., and put to industrial use recently by Ford Motor Co. The wood, sliced into veneer sheets $\frac{1}{10}$ in. thick, is soaked with phenolic resin, then cured by heating. These sheets are glued together to make boards of desired thickness. Tests show that the material changes size due to humidity variations less than a third as much as regular mahogany.

Ford has used the impregnated mahogany in models for Kellering fender, body, roof, and similar dies because of its stability. Experimentally, the material has also been used for shell mold patterns where Ford finds it's ideal for small runs and experiments requiring a thousand or so impressions. The wood has been up to 400 F for as long as 41 hr without charring.

Plastic impregnated mahogany is described in a paper entitled "Application of Impreg for Patterns and Die Models" by Ray M. Seborg, chemist, Forest Products Laboratory, and A. E. Vallier, manager, Experimental Fabricating Dept., Ford Motor Co.

Tells Control Story

We would appreciate any additional information you can give us on STATISTICAL QUALITY CONTROL FOR FOUNDRIES, which was mentioned in your September issue.

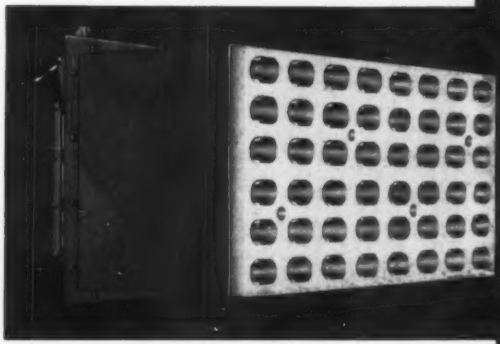
TOM BANTA, *Ind. Eng.*
Lebanon Steel Foundry
Lebanon, Pa.

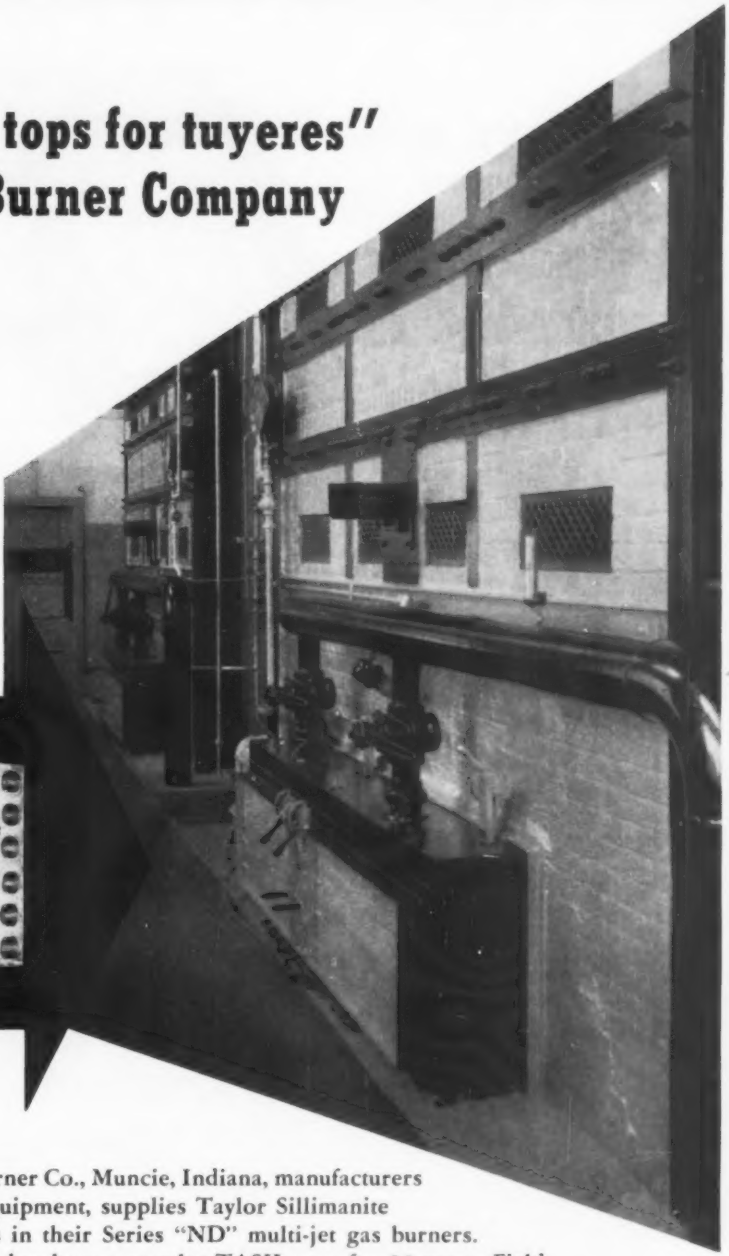
This book was mentioned in the article "Statistical Quality Control for the Foundryman" by Ross Martin, Jr., works manager, Glamorgan Pipe & Foundry Co., Lynchburgh, Va., which appeared in the September issue of AMERICAN FOUNDRYMAN, *pages 50-55. Entitled* STATISTICAL QUALITY CONTROL FOR FOUNDRIES, *the book was published by AFS to show foundrymen how to use statistical quality control to improve quality, reduce costs, and make supervision easier. It describes actual applications in the shops of its foundrymen authors, as well as covering principles. AFS member price is $4.50; non-member price is $6.75. Write to American Foundrymen's Society, Golf & Wolf Roads, Des Plaines, Ill.*

continued on page 24

"Tasil is tops for tuyeres" says Maxon Premix Burner Company

Shown at right are two banks of Maxon Series ND-48 Burners installed in water tube boilers in a southern brewery. Photo below shows TASIL tuyere port blocks assembled on the firing end of the burner.





The Maxon Premix Burner Co., Muncie, Indiana, manufacturers of industrial burner equipment, supplies Taylor Sillimanite (TASIL) tuyere blocks in their Series "ND" multi-jet gas burners. In fact, Maxon Premix has been a regular TASIL user for 20 years. Field results, over this lengthy period, have convinced them that TASIL burner blocks give extended life with freedom from cracking or spalling . . . TASIL chemical and physical properties make permanent the benefits of Maxon Premix unique tuyere design.

Because TASIL (premium Indian kyanite base) or TAMUL (sintered synthetic mullite base) burner blocks hold their original shape and dimensions longer than high duty, super-duty or alumina-diaspore fireclay blocks, they are widely used in heating, forging and metal-melting furnaces.

Why not find out what TASIL or TAMUL can do for you?

The CHAS. TAYLOR SONS Co.
A SUBSIDIARY OF NATIONAL LEAD COMPANY
REG. U. S. PAT. OFF.
REFRACTORIES SINCE 1864 • CINCINNATI • OHIO • U. S. A.

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REFRACTORIES ENGINEERING AND SUPPLIES, LTD.
Hamilton and Montreal

For more data, circle No. 743 on postage-free Reader Service card on p. 17 or 18

Letters

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Story Packed with Ideas

The round table discussion of pH in the September issue (pages 34-39) was an excellent way of covering the subject. There was a lot of good information per square inch of page.

HARRY R. DAHLBERG, *Fdry. Eng.*
E. W. Bliss Co.
Hastings, Mich.

For more on pH, see Prof. G. J. Barker's discussion of clay behavior and chemistry on pages 44 and 45 in this issue.

Tear Sheets Gladly Sent

One of our engineers is interested in W. Y. Buchanan's article, *"Cupola Melting of Cast Iron Borings and Steel Turnings,"* p. 13, May, 1954, AMERICAN FOUNDRYMAN. We would appreciate your sending us tear sheets or reprints, if available.

C. S. IDEN
Librarian
International Harvester Co.
Chicago

I would like to receive a copy of *"Induction Melting,"* as printed in your June, 1954, issue.

L. A. STOYELL
Electro Metallurgical Co.
Niagara Falls, N. Y.

I would appreciate your sending us six reprints of the article *"D Process for Precision Castings"* by Harry W. Dietert which ran in the August issue of AMERICAN FOUNDRYMAN.

E. O. SARRATT, JR., *Sec.-Treas.*
Kincaid-Osburn
Electric Steel Co.
San Antonio, Texas

Irish Ironfounders' Elect Officers

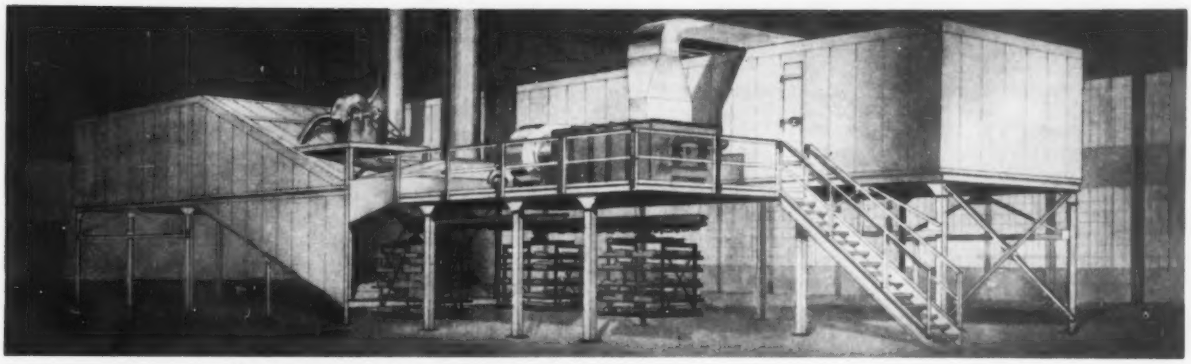
The following officers and committee of the Irish Ironfounders' Association were elected recently:

Chairman, S. W. Aitken, Hammond Lane Ironfounders, Ltd.; Secretary, A. J. R. Cullinan; Committee: P. J. Lawless, Wexford Engineering Co.; G. Taylor, Drogheda Iron Works Co.; C. Tonge, Tonge & Taggart, Ltd.; P. E. W. Burgess, Western Iron Co., Ltd.; G. J. Rowe, Hammond Lane Foundry Co., Ltd., and T. Jessop Davis, St. John's Works.

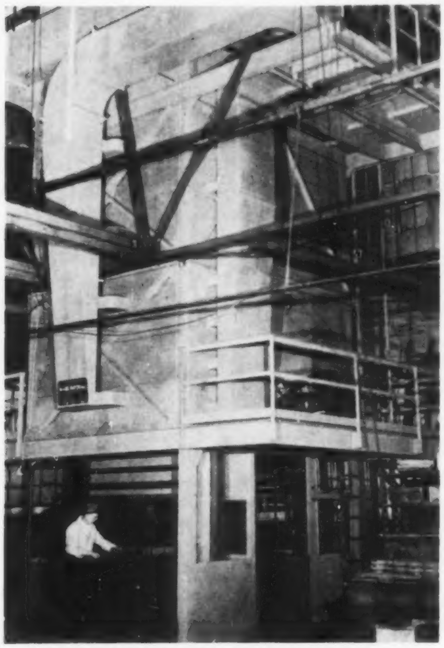
Free Tear Sheets

of all AMERICAN FOUNDRYMAN articles are available on request. Keep your magazine intact and pass it on for others to use. For free tear sheets, write to Editor, AMERICAN FOUNDRYMAN, Golf & Wolf Roads, Des Plaines, Ill. Please show company connection and your title on tear sheet request.

For more data, circle No. 752 on postage-free Reader Service card on p. 17 or 18



CARL-MAYER HORIZONTAL MONORAIL CORE OVEN at Eclipse Aviation Co. Patent No. 2355814.



CARL-MAYER VERTICAL CORE OVEN at G.&C. Foundry Co. Patents No. 2,628,087 and 2,257,180.

"BIG" *engineering brings big foundry oven jobs to—*

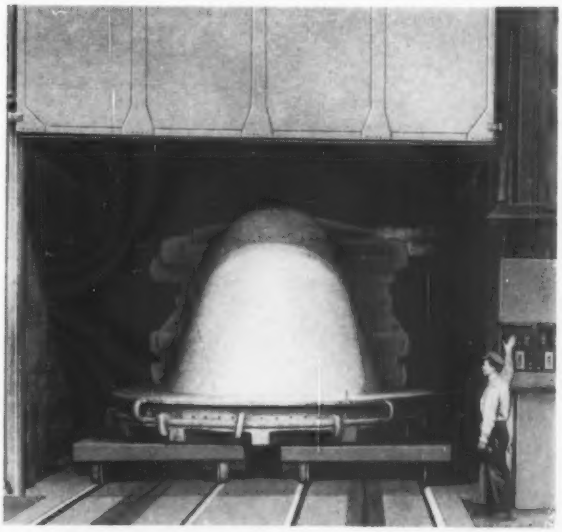
CARL-MAYER

Carl-Mayer designs embody patented features which contribute to highest efficiency and economy in operation.

It will pay you to consult us on your next core baking and mold drying problem. We build ovens of all types and sizes, also other types of industrial ovens and furnaces. WRITE FOR BULLETIN NO. 53-CM.

CARL-MAYER CORE AND MOLD OVENS ARE SERVING CONCERNS LIKE THESE:

Aluminum Co. of America
American Brake Shoe Co.
American Radiator Co.
Ashland Malleable Iron Co.
Blaw-Knox Co.
Brown Industries
Buick Motor Div. of General Motors Corp.
Bucyrus-Erie Co.
Cadillac Motor Div. of General Motors Corp.
Centre Foundry Co.
Columbia Steel Corp. (U. S. Steel Corp.)
Crucible Steel Castings Co.
Dunkirk Radiator Co.
Eclipse Aviation Division of Bendix Aviation Corp.
Electric Autolite Co.
Ford Motor Co.
Fremont Foundry Co.
G. & C. Foundry Co.
General Electric Co.
General Motors Corp. and Subsidiaries
Gilbert & Barker Co.
General Steel Castings Co.
Golden Foundry Co., Inc.
Henry Kaiser Corp.
W. O. Larson Foundry Co.
Mesta Machine Co.
F. E. Meyers & Bro. Co.
Oil Well Supply Co. (U. S. Steel Corp.)
Packard Motor Car Co.
Pittsburgh Steel Foundry Corp.
H. B. Salter Co.
Shenango Penn Mold Co.
Standard Foundry Co.
Union Brass & Metal Mfg. Co.
Union Steel Castings Co.
West Michigan Steel Castings Co.
A. C. Williams Co.
Whiton Machine Works
Whiting Corp.



CARL-MAYER MOLD OVEN. One of a battery of two at Pittsburgh Steel Foundry Corp. Capacity: 100 tons per charge (each oven). Patented.

THE CARL-MAYER CORPORATION

3030 Euclid Ave., CLEVELAND, OHIO

Backed by reputation and over 30 years' Experience

For more data, circle No. 757 on postage-free Reader Service card on p. 17 or 18

Foundrymen in the News

W. Clausen has been appointed executive vice-president of General Metals Corp., and general manager of its Enterprise Engine & Machinery Div. He was vice-president and general manager of Sangamo Electric Co., Ltd. of Canada, with headquarters in Toronto, Canada.

Sidney W. Taylor has been appointed secretary of Mechanical Standards Board and engineer in charge of American Standards Association staff operations for mechanical standardization projects. He replaces **Dr. John Gaillard** who retired in December 1953 and is now a management consultant.

Leon A. Seeber has been named branch manager in the Minneapolis sales office of Kaiser Aluminum & Chemical Sales, Inc. He succeeds **Leroy S. Young**, who has been appointed assistant district manager of the Detroit sales office.

James C. Brown has been appointed chief chemist of the Michigan Abrasive Co.

James H. Moore has been appointed general manager of the Vacuum Metals Corp., with general offices in Syracuse, N. Y. Vacuum is jointly owned by Crucible Steel Co. of America and National Research Corp.

Charles E. Vanderpool has been promoted to sales manager for the Rotor Tool Co., Cleveland. He joined the firm in 1947 as sales promotion and advertising manager.

Jim Sutter has been appointed sales engineer for the Frank G. Hough Co., Libertyville, Ill. In his new position he will act as liaison between the sales dept., Hough district representatives and other departments and will also be concerned with product improvement and development of the company's line of Payloader tractor-shovels and tractors.

M. R. Tenenbaum will represent Lester-Phoenix, Inc., in the Michigan area, in the sales and service of the firm's die casting machines and injection molding machines.

Charles K. Garrison has become associated with the Calumet Steel Castings Corp., Hammond, Ind., as sales manager and engineer of all alloy steel castings.

Peter Gasperini has been appointed to the sales department of Cooper Alloy Corp., Hillside, N. J. He will be attached to the Valve & Fitting Div.

Dr. Robert L. Womer has been appointed vice president in charge of research and development for the Speer Carbon Co., St. Marys, Pa. He was formerly assistant for divisional research, Olin Mathieson Chemical Corp.

William Mitchell has recently been promoted to superintendent of the Utility Steel Foundry.

Ray Dorsey has accepted the position of foundry superintendent at the Apex Steel Foundry.

John Parks has been appointed foundry superintendent at the Enterprize Ductile Iron Foundry.

Seymour A. Shaw has been promoted to the position of plant superintendent of the Fahralloy Co., Harvey, Ill. He has been with the firm for the past 18 years.

Ronald D. Gumbert, Cleveland, has been appointed vice-president of the Mercast Corp., New York City. He will continue as executive vice-president of Alloy Precision Castings Co., Cleveland, a Mercast licensee. He was previously connected with the Carnegie-Illinois Steel Co. and the Armstrong Cork Co.

Harry E. Gravlin has been appointed assistant to C. B. Schneible, president of C. B. Schneible Co., Detroit. He was formerly general production superintendent, Lincoln-Mercury assembly plant, Wayne, Mich., and prior to that was production manager, Dearborn Iron Foundry.

Dr. W. H. Ruten has been promoted to professor of mechanical engineering and chairman of the metal processing department of Polytechnic Institute of Brooklyn. He is vice-chairman of the Educational Div., AFS, and also chairman of the Program and Papers Committee.

Allin P. Deacon has resigned from Cockshutt Farm Equipment Ltd., Brantford, Ontario, to open his own office in Brantford as a consultant in statistical quality control.

James R. Hewitt has joined Texas Foundries, Inc., Lufkin, Texas, as assistant to the president. For the past five years he has been president of Hewitt-McGrail Co., Houston, Texas.

General Walter Bedell Smith, who retired as Under Secretary of State, has been elected vice-chairman of the Board of Directors of American Machine & Foundry Co., New York City.

H. B. Plunkett has been elected executive vice-president of the A. P. Green Fire Brick Co., Mexico, Mo. He has been with the firm for over 35 years. In recent years he has served as vice-president and manager of the Domestic and Canadian Affiliate Companies.

Walter J. Assel, Canton, Ohio, has been appointed engineering consultant on smoke, dust, fume and gas control problems pertaining to steel mills and electric furnaces by Mechanical Industries, Inc., Pittsburgh, Pa. He retired recently after serving 29 years as chief engineer of the Steel and Tube Div., Timken Roller Bearing Co.

D. C. Hart has recently been appointed sales representative of the Federal Foundry Supply Co., Cleveland. He was formerly foundry superintendent of the Posey Iron Works.

continued on page 32

R. G. Gumbert . . . vice-president

J. Sutter . . . sales engineer

W. J. Assel . . . consultant

D. C. Hart . . . sales representative

SIMPSON

Porto-Mullers

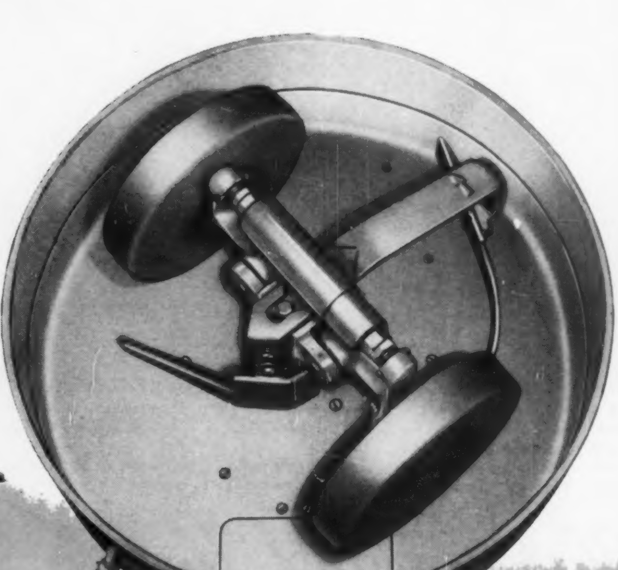
Here's a completely self-contained mixer "package" that can go anywhere in the foundry . . . to do a thorough, consistent mixing job on any kind of sand —from the toughest steel facing sand to the most intricate shell and "D" process formulations.

Designed around the practical theory that it's cheaper and easier to bring the muller to small mixing jobs than it is to haul sand to the muller. The Simpson Porto-Muller is making *real* economy possible on hundreds of jobs where makeshift mixing practices formerly took a large toll in wasted core oils, binders and extra man-hours. Many users report up to 50% savings in materials and/or manpower during the first week of operation.

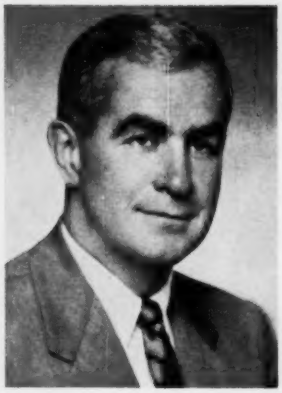
Built to the same high engineering standards as all Simpson Mix-Mullers, the Simpson Porto-Muller is a favorite with foundrymen who *know* mulling. Here's why over 500 of them have been purchased in 5 short years. Here's why *any* foundry has a job for the Simpson Porto-Muller.

QUICKLY CHARGED from wheelbarrow or sand pile, the sand is handled only once. Porto-Muller tips to convenient loading height. Note dust cover and large implement type wheels.

DISCHARGE IS SIMPLE. Just open the large bottom door and *plows* do the work. Door located at proper height for wheelbarrow.

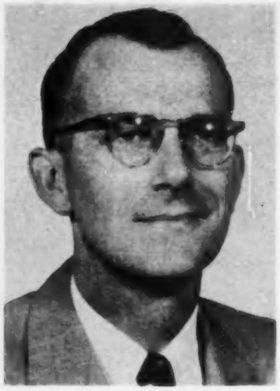


POSITIVE, CONTROLLED MIXING ACTION. Spring-loaded mullers permit easy and infinitely variable adjustment of muller pressure—permits use of light mullers, yet you can adjust to mull *any* sand.



R. B. Parker . . . assistant to pres.

N. G. Belury . . . sales vice-pres.



J. D. Fraser . . . joins Bartlett

R. L. Reed . . . district manager

continued from page 28

Robert L. Reed has been appointed district manager of the Pittsburgh office of Electro Metallurgical Co. Div., of Union Carbide and Carbon Corp. He joined the company as a sales engineer in 1946 after completing some confidential metallurgical research for the War Department.

James D. Fraser has been appointed to the foundry sales department of C. O. Bartlett & Snow Co., Cleveland. He was formerly associated with the Chicago Works of the National Malleable & Steel Castings Co.

N. George Belury has been appointed sales vice-president of American Brake Shoe Co., and **Robert B. Parker** has been appointed assistant to the president for personnel. Mr. Belury, who also continues as president of the company's Engineered Castings Div., joined Brake Shoe in 1937 as a sales apprentice in the Brake Shoe & Castings Div. Mr. Parker, who formerly was in charge of commercial research and apprentice recruiting, will now be responsible for management personnel training and development.

B. D. Claffey has joined the Dayton Malleable Iron Co., Dayton, Ohio, as general manager of the company's Ohio Malleable Div., in Columbus. He will also have general charge of an expanded research and development program, which will be carried on at a central laboratory to be established in three buildings which were formerly part of the company's West Third Street Plant.

R. W. de Weese has been appointed vice-president in charge of sales for the Electric Steel Foundry Co., Portland, Ore., and **Jefferson J. Davis** has been appointed vice-president in charge of product divisions. Mr. de Weese is a veteran of 14 years of service with ESCO. His experience includes production and inventory control, branch and organizational problems, and stainless steel casting production. Mr. Davis joined the ESCO-Seattle branch of the company in 1936 and in 1942 established and managed the ESCO-Eugene, Oregon, branch where he remained until 1943 when he became co-manager of the logging rigging division of the main plant in Portland.

P. S. Hoffman, Jr., has been elected vice-president in charge of manufacturing of the Donegal Manufacturing Corp., Marietta, Penn. Coming to Donegal in 1950 from Treadwell Engineering Co., Easton, Pa., where he was metallurgist, he has held succeeding positions as metallurgist, foundry superintendent and works manager.

Frank M. Moses has been appointed in charge of Semet-Solvay coke sales for the Wilson & Geo. Meyer & Co., San Francisco. His territory will cover the 11 Western States.

George Beach has been promoted to assistant to the sales manager of Cleco Pneumatic Tool Company's South Central Sales Div., which includes Texas, Louisiana, New Mexico, Oklahoma, Arkansas and Mississippi.

Robert S. Bubb has been named director of market research. He joined Brake Shoe in 1951 as market engineer.

Robert Lee Weidman has been appointed technical sales representative for Cooper Alloy Foundry Co., Hillside, N. J., in the Mid-Atlantic states. He will work in close association with Barclay Powell, district representative.

Henry D. Phillips has joined Adirondack Foundries and Steel of Watervliet, N. Y. as vice-president in charge of sales and operations. He was formerly president of Hartford Electric Steel Corp., Hartford, Conn.

Jean S. Murphy has been appointed Eastern sales and service representative for Shallway Corp., Connellsville, Pa., sales and service distributors for Shalco Shell Molding Equipment.

B. D. Claffey . . . general manager

P. S. Hoffman, Jr. . . . promoted

J. J. Davis . . . products div. v-p

R. W. deWeese . . . charge of sales

CRUCIBLE FURNACES

melt all the metal

in this well known Eastern Foundry

THE PHILADELPHIA BRONZE AND BRASS CORPORATION

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PRODUCER of non-ferrous castings, maintains uniform quality and meets specifications by using only Crucible melted metals.

MELTING EQUIPMENT consists of seven stationary coke fired furnaces (illustrated) each of 900 pounds capacity; three tilting Crucible furnaces (illustrated) oil fired, each 1200 pounds capacity and four stationary oil fired furnaces (not illustrated) 450 pounds capacity each.

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GIVES OUR CASTINGS A GLEAMING, NATURAL METALLIC FINISH—A BETTER FINISH THAN WE'VE EVER HAD BEFORE"

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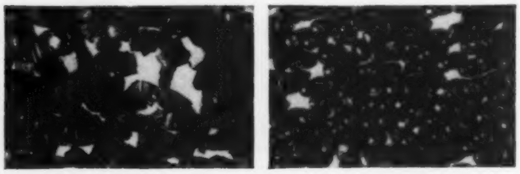
CUT STEEL is entirely different than any other abrasive, in appearance and in performance. Composed of small particles cut from high grade alloy steel — it actually work-hardens in use — cleans better and lasts longer than any other abrasive. ***Yet, Grade "A" CUT STEEL costs less than most cast steel shot — Grade "B" no more than malleable shot!***

If you'd like to get a better finish than you've ever had before, faster and more economically — then be sure to try CUT STEEL. Send for samples, literature or a trial order — TODAY!



CUT STEEL changes shape in usage. Its original form is grit-like, with sharp edges and corners. But in production, it rapidly changes to a spherical shape, in a variety of sizes. The smaller pellets contribute to its efficiency by penetrating to even the hardest-to-reach parts of castings.

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Talk of the Industry

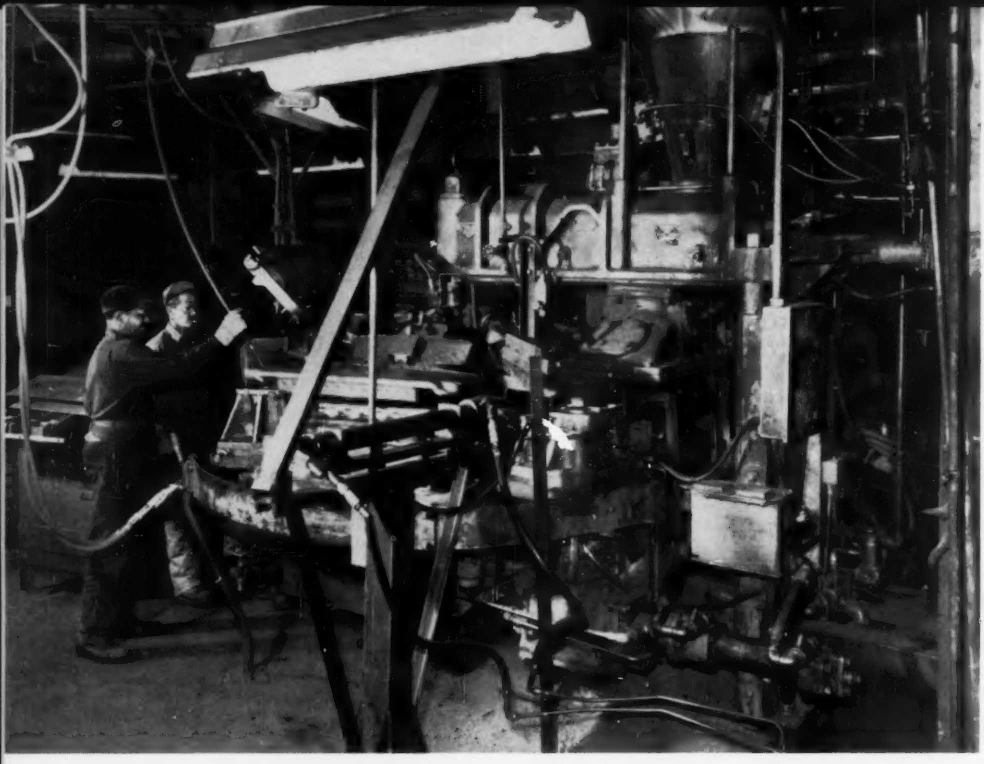
NO INDUSTRY IS AS WILLING TO GAMBLE so much on so little information as the foundry industry according to Lester B. Knight, Lester B. Knight & Associates, Inc., Chicago. He was emphasizing the importance of good cost, production, and maintenance data to sound foundry management at the New England Regional Foundry Conference. The information almost always is available if someone will take the trouble to dig it out, he pointed out.

TRAINING PROGRAMS MUST BE EXPANDED according to indications given in a study of mobility of molders and coremakers carried out by the Air Force. Some 1800 men were interviewed in a 12-year investigation of workers from 195 foundries in eight important metal working cities. Loss through death and retirement in the next ten years is estimated at 18,000 while entrances into the industry will be only 14,000. Shifts to other industries and induction by the Armed Forces in event of a national emergency would reduce the anticipated entrances, making the shortage of workers more serious. Survey shows that molders and coremakers are a stable occupational group. Only 10 per cent changed their cities of employment during the 12-year survey period and 80 per cent of this small number made but one or two such changes. More than half did not change jobs at all. The report states "the two outstanding features of the work histories of molders and coremakers interviewed were their strong attachment to their employers, to the occupation, and to the area in which they work, and on the other hand, the fact that the molders who did change jobs were able to shift freely among the various types of foundries."

TIME FOR A CHANGE. Address of American Foundrymen's Society and AMERICAN FOUNDRYMAN has been Golf & Wolf Rds., Des Plaines, Ill., since October 1, but some mail is still being addressed incorrectly to 616 S. Michigan Ave., and even 222 W. Adams St. (obsolete since early 1950), in Chicago. Result is delay in getting your message to us plus cost of forwarding hundreds of pieces of mail daily. Please check your mailing list.

OPTIMISM ABOUT BUSINESS was expressed by more than one hundred foundrymen who visited United States Steel's new 1350 ton daily Blast Furnace "A" in Cleveland recently. Asked "Do you look for general business conditions to improve for the balance of this year?" the answers were: yes, 77; no, 23 . . . "What about 1955?" Worse than 1954, three; about the same, 35; better 57; much better, four . . . "In your opinion what is the outlook for activity in the foundry industry for the balance of this year as compared with current levels?" Worse, 5; unchanged, 36; better, 55; much better, 4 . . . "What about the foundry industry's prospects in 1955?" Poor, 1; fair, 50; good, 47; very good, 2.

LONG AFTER CLOSING, the 1954 AFS Convention and Exhibit continues to exert its influence. The October issue of Industrial Marketing (p. 148) tells how equipment models, full size and miniature, help sell at an AFS Show. American Exporter, both United States and South American editions, carried six pages (35-40) under the head "New Methods Speed Up Foundrywork." Meanwhile, as the program for the 1955 Convention (non-exhibit) in Houston May 23-27 develops, the AFS Exhibits Dept. under Al Hilbron is already planning for the 1956 Convention and Show in Atlantic City, May 3 through May 9.



Automatic, five-station core blower with blow head at right and power vent in foreground.

Automation in Core Making

C. W. Hockman/*Foundry Superintendent*
Cadillac Motor Car Div.
General Motors Corp., Detroit

Co-ordination of men, methods, materials, and machines for high production calls more and more for automation. Here are the author's experiences with automatic, rotary, five-station core blowing machines as told at the Metals Casting Conference, Purdue University.

■ Cadillac operates an automotive gray iron foundry with a capacity of 400 tons per 16-hour day. The foundry normally employs about 800 men. Complete facilities, including four 84-in. shell cupolas, two core sand mixers, a sand reclaim system, pattern shop, three loop molding lines, and a jobbing floor.

Every cast part of the engine is made in the Cadillac foundry. Also cast are: transmission cases, retainers, jobs for the Detroit Transmission Div. of General Motors, and a myriad of castings (especially experimental and small lots) for other General Motors divisions and outside vendees.

The foundry currently produces over 40 different production jobs which vary considerably in size, shape, and weight. Shipping weights range from 0.46 lb for a rocker arm bracket to 235.33 lb for the cylinder block. Twenty-seven castings use a total of 86 different cores ranging in weight from 0.01 lb for a plug core to 80.30 lb for an unassembled crankcase core.

Operations of the core room were unsatisfactory the summer of 1952. It was difficult to meet production schedules; scrap was excessive, running as high as 36 per cent on one critical core; and utilization of man power was much too low with five men producing 110 cylinder block jacket cores per hour. Furthermore, the increase in production schedule for the next year indicated that these conditions would probably get worse.

Examination of a multiple-acting, automatic core blower showed that it had the potential for solving all of the problems.

The machine as originally designed used five identical dump-type core boxes with one conventional blow plate. The manufacturer modified the machine to run up to five different jobs and introduced the first one of this type in the Cadillac foundry. The boxes are of the open type. Each has a sub-blow plate attached to its cope. The sand magazine is fitted with a master blow plate designed to work with all of the sub-blow plates running. The foundry has two of these machines which are referred to as No. 1 and No. 2 in order of installation.

These machines consist of a special core blowing mechanism and rollover-draw apparatus interlocked with a five station indexing turntable. Eleven electrically activated cams control nine solenoid valves which supply compressed air to operate the various mechanisms. Eleven limit switches performing 15 different functions protect the No. 1 machine. The indexing cycle is set by a variable speed drive and timed by the operating cams.

Geneva Movement Controls Turntable

A modified Geneva movement controls acceleration and deceleration of the turntable and permits either clockwise or counter clockwise rotation by the proper adjustment of controls on the air supply lines to the indexing cylinder. Special control buttons allow the turntable, blower, or rollover-draw to operate independently and facilitate maintenance. More circuits can be wired into the system to handle any additional operations required.

The machine can blow up to 421 cores per hour; but is claimed to run most efficiently on a 10-sec cycle blowing 360 cores per hour. Both of Cadillac's machines are set at the latter speed and index counter clockwise. Two men operate the No. 2 machine; however the particular jobs run on the No. 1 machine require three operators.

The basic operation of the machine is as follows: At Station 1 the sand magazine moves out from the turntable and receives sand from the overhead hopper while a core box with the cope down is indexed into the blow position. The magazine then moves directly above the box, the box is raised and clamped to it, and the core is blown.

Box Is Lowered to Station 2

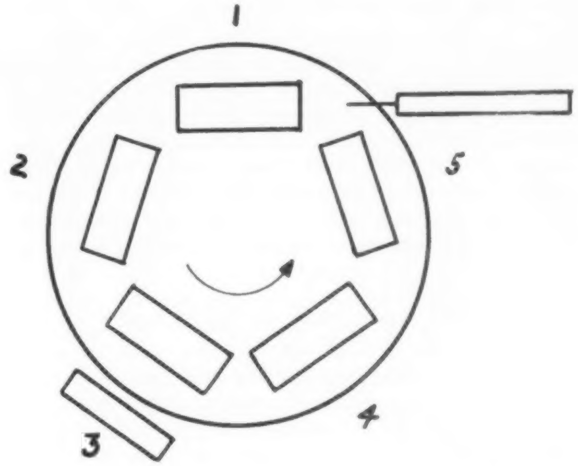
The box is then lowered and indexed to Station 2 while the sand magazine moves out again to receive more sand. At Station 2 the cope lifter raises the cope and keeps it up until it reaches Station 5. The operator positions a drier on the core, and the box is indexed to Station 3. Here the rollover clamps grasp the top of the drier; the box is rolled over and the core drawn.

The rollover then rights itself while the second operator places the core on the oven conveyor. The empty box is indexed to Station 4. Station 4 and 5 are make-ready points where the box can be cleaned, parting applied, and wires and loose pieces placed. On leaving Station 5 the cope lifter comes down and the core box returns to Station 1. The rollover-draw can be located at Station 4 instead of 3 if circumstances require it.

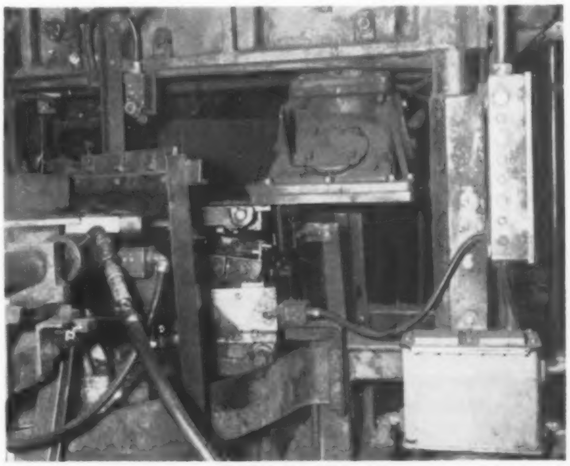
Manual operations on the machine are limited to the placing of driers, loose pieces, and wires, and the removal of cores. Every other phase of the core making process is automatic.

Both sections of the core box are mounted on platens which are supported on cradle arms at each station. Since this eliminates bolting and unbolting two advantages have resulted: a complete box is changed over in an average of 4 min compared to 15 or 20 min on a conventional blower; and when one box is removed for repairs, etc., it is quickly lifted out while a limit switch is set so that the machine continues running the other jobs, skipping the empty station at the blower.

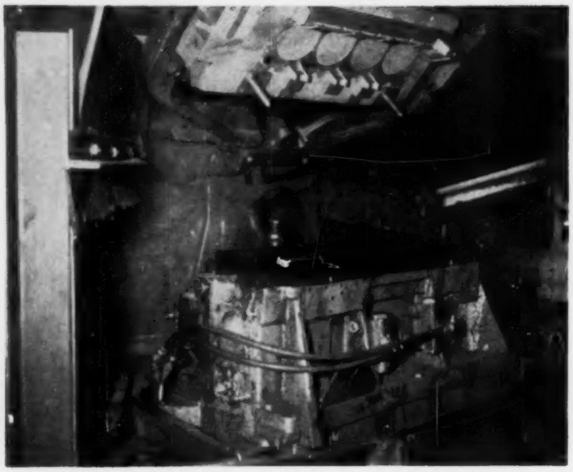
The master blow plate is similar to the ordinary blow plate on a conventional machine and like that one has to be removed at the end of each day's run for cleaning and inspection. Changing requires 12 to 15 min and rarely has to be done during production.



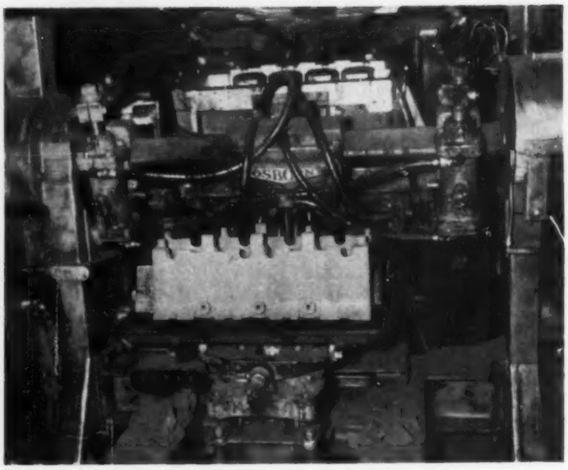
Sequence of stations with table rotating counter clockwise is: 1. Blower 2. Make-ready station where driers are mounted. 3. Rollover-draw. 4 and 5. Clean, apply parting, place loose pieces and wires. Power vent is between 5 and 1.



Station 1 with sand magazine in loading position and core box moving into blow position.



Station 2 with cope lifter up. Plate has been placed on core. Note wipe-off grid on left.



Block jacket core has just been drawn at Station 3 and is ready to be placed on oven conveyor.

The automatic machines were placed on either side of the horizontal oven conveyor. Stations 2 and 3 of both machines are adjacent to the conveyor enabling easy placement of driers and removal of cores. Since length of air lines seemed not to effect operations, control panels and limit switches were moved several feet away to keep sand out and to allow for accessibility for maintenance without interfering with production.

Remove Machine for Drier Chute

Each automatic displaced just about the space occupied by two conventional machines. One more machine by two conventional machines. One more mato make room for an inclined drier chute and scrap-sand pan. This chute replaced the table previously used because it occupied less space and its cover protects the driers from sand.

One change in the core room operation which the automatics facilitated was an increase in blowing air pressure. This could not be done with the conventional blowers because they are made with piston type blow valves and too high a pressure blows the rubber seal ring out of place. The diaphragm type blow valve on the automatics makes possible the increase in air pressure from 100 to 135 psi and the air volume for the blow action alone has been increased from about 21 cu ft per blow to about 26 cu ft per blow.

Such changes were essential for use of the machine because they enabled the rollover to act more smoothly with less jar, activated the valves quickly enough for the established cycle, and provided a better control of the operation. Improved blowability has permitted moisture content to be raised with a simultaneous reduction in the use of bond, core oil, and especially core wires (an expensive item in core making). Higher air pressure and volume have helped to produce a denser, harder, and more clean cut core.

One of the several factors that governed the choice of cores to be run on the automatics was the limitation to boxes 15 x 36 in. with a draw of 10 in. Elimination of the overly large cores was followed by a choice of the most critical ones from the standpoint of both quality and quantity required. From this group were chosen those jobs which would most readily lend themselves to the use of the same core mix. The automatics thus brought about a reduction in the number of core mixes in use.

The cores picked to run on the No. 1 machine were the cylinder block barrel and jackets, and the cylinder head top and bottom jackets. The specifications for these cores are:

Moisture	2.8 — 3.0%
Green Strength	1.00 — 1.20 psi
Dry Strength	150 — 200 psi
Permeability	170 — 225
Gas Evolution	27 cc/gm max.

The mix used to attain these specifications consists of 1000 lb each reclaimed sand and lake sand, and 25 lb cereal flour mixed 3½ min. Water to bring moisture up to 3 per cent is added and mixed for 2½ min. Following addition of 12 qt core oil and 2 qt sand conditioning oil the mixer is run another 3½ min.

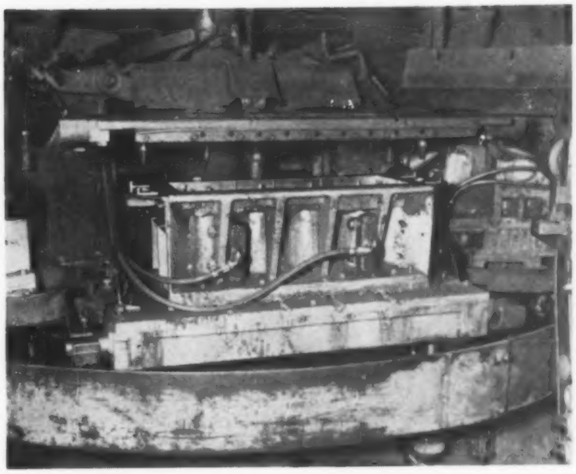
Core Mix Different for Each Machine

Currently made on the No. 2 machine are cores for the intake and exhaust manifold, water pump body, and rear retainer shaft. Boxes are being prepared for additional cores. The specifications and core mix for these jobs are, of course, different from those for the No. 1 machine.

An additional arrangement had to be made on the No. 1 machine. The block jacket and top head jacket cores require vents. A power vent was installed with an adjustable timing control so flexible that it permits the use of any combination of cores in any sequence on the turn-table.

This description of the installations and preparations for them provides an example of the relationship between automatic apparatus and two other components of the foundry process, materials and methods. The automatics have brought about changes in material usage and resultant lower material costs. As regards methods, the connection is more reciprocal. Introduction of the machines standardized and improved methods, while the latter were changed to

At Station 4, core box is made ready for another cycle by cleaning (left hand) and spraying (right hand).



Cylinder block barrel core box at Station 5. Like 4, this station is used to prepare box for next cycle.

promote more effective use of the machines themselves.

The early results with the automatics left a good deal to be desired as production was well below capacity while scrap and down-time were too high. This can be anticipated with radically new equipment and people unfamiliar with its features. Performance has steadily improved with experience and training of personnel.

Changes were made on the machines. Rubber wipe-off grids for the sub and master blow plates were installed around the blow station so that both plates are brushed clean by the movement of the turntable and sand magazine before and after each blow. This has reduced "blow by." The steel covers on limit switches and gaskets were replaced with dust tight transparent plastic ones to aid quicker diagnosis of mechanical failures. A braking device was put on the cope lifters to hold them secure in the up position and protect the operators hands from being injured if the cope lifters should fall.

Power Vent Was Improved

The power vent was improved by the substitution of a funnel-shaped guide for the bell-shaped guide and a double-acting telescopic cylinder for the single-acting cylinder. These changes made possible the use of a shorter rod and a more accurate stroke which reduced the frequency of bent and broken vent rods.

Comparison of the production on the automatics with the conventional blowers and double rollovers they replaced are interesting. Production on No. 1 machine per man hour was raised from a capacity of 42 to 120 and from an average of 41 to 104. Production on the No. 2 machine where four of the six cores were previously rolled over rose from a capacity of 105 to 180 cores blown per man hour and an average of 103 to 154.

Automatics have tremendously increased productive capacity and actual production. Two important concomitant results of this increase have been a substantial savings in labor, and the relief of congested space through elimination of six conventional blowers. In addition, running time needed to meet the normal schedule has been cut on several conventional blowers by a total of about 16 hours. When more jobs are transferred from these blowers to the No. 2 machine, it is estimated that machine time on them will be reduced by about another 12 hours.

Some factors probably responsible for the production increase are: the combining of several machines in one synchronized unit; the automatization of many manual operations; and the substitution of a mechanically fixed cycle for manual control of a machine's frequency of operation.

Exact scrap comparisons would not be too valid because there are numerous variables which may be responsible for a given effect and because changes often may be made in processes, materials, etc. Scrap figures are 4.8 per cent on the No. 1 machine and 2.8 per cent on the No. 2 machine; both well below the foundry's averages with the same cores as previously made. Furthermore, the cores in general are cleaner, denser, and harder. Hardnesses average 83, 85, 85, and 87 respectively on the barrel, block and head jackets, and intake cores. This improved hardness makes them, among other things, less susceptible to sag and breakage while being transported in the green.

The improved core quality has resulted in less casting defects caused by cores and smoother finishes on casting surfaces. Progress along this line can probably be traced to such things as the great reduction in the number of manual functions, consistency of operation, and higher air pressure and volume.

The most serious problem that has arisen through use of the automatic core blowers is the one which plagues all automatic multiple operation machinery —excess down-time and high maintenance costs. Hundreds of moving parts functioning every ten seconds undergo tremendous wear. Both automatics accounting for slightly over 50 per cent of total core production have a maintenance cost that has steadily declined to about 50 per cent of the total blower maintenance costs.

Calculations on the No. 1 machine show an average of 7.02 min down-time per hour; 2.76 min were pat-

Parting spray can also be applied automatically.

tern time (including schedule changes) and 4.08 min machine time. The worst trouble spots in order were: power vent rods, limit switches, cope lifter, rollover clamps, broken hoses, and machine out of index.

Of the average down time of 5.94 min per hour for No. 2 machine, 1.68 min were pattern time (including schedule changes) and 3.60 min machine time. The most down-time was caused by difficulties with the rollover clamps, limit switches, and cope lifters.

Several measures were taken to attack some of the major causes of down-time. Better core box construction has almost entirely abolished down-time on No. 1 machine. Bent or broken vent rods are rare. Wear and breakage on air hoses leading from the control units to the machines have been sharply reduced by changing the rubber hose to steel tubing.

Cores Can Be Handled More Carefully

An automatic core box spray on No. 2 machine has eliminated a manual operation and allowed the operator opportunity to handle cores more carefully. This device is not used on the No. 1 machine because the third operator is needed for placing end-print driers on the block jackets and a hand spray is more effective on the type of core boxes run on this machine. Twenty-gallon spray tanks have replaced 5 gal tanks to eliminate refilling during a 16-hr run.

Light panels wired to the limit switches have made diagnosis of limit switch trouble much easier by providing an immediate picture of the ones that are not functioning. Replacing delicate pilot-operated valves with sturdier direct-operating ones has bettered the valve wear situation.

The down-time problem has been approached in another way: a separate plan for preventive maintenance. In this connection the relationship between methods and machines is very important. Without an adequate, consistent, and functioning program of preventive maintenance all the substitution of parts and process redesign imaginable could not alone keep automatic machinery running.

Automation by its very nature develops fuller utilization of manpower and reduces labor costs. Maintenance and service of automatic machinery is dependent upon men and in this sense provides more employment for skilled labor.

The foundry will cut down on rollover clamp maintenance and core breakage simultaneously by taking two steps. Adding steel blocks to some core boxes will equalize their weight and enable proper and fixed adjustment of the rollover and clamps. Better control and smoother operation of the rollover will be obtained by replacing gravity with power on the down stroke.

One of the most important installations planned is an automatic lubricating system. This will eliminate manual lubrication, keep all moving parts continually oiled, and inject oil into the bearings, etc., in such a way that it will flush dirt and sand out instead of bring it in.

A safety device will be installed to prevent the turntable from reversing its direction, and damaging the cope handler cylinder and endangering the operators. Bronze wear plates on the indexing slide will be changed to hardened and ground steel wear plates.

The cope handler cam rollers are held to the center shaft by lock washers which have jarred loose and caused the rollers to fall off. These rollers will be replaced by different ones which will be held fast to the shaft and eliminate lock washers and bearings.

Alterations will be made on No. 2 machine to make core boxes interchangeable so it can be a standby for No. 1 which produces more critical cores.

Production Increased About 15 Per Cent

The cost of making new core boxes and blow plates for both automatics is about 60 per cent higher than it was for the conventional machines. Maintenance costs on this equipment runs about double on the No. 1 machine and about 50 per cent higher on the No. 2 machine. The production on the automatics, however, increased about 15 per cent.

Conclusion. The automatic core blowers have substantially increased production per man hour and have, thereby, also reduced costs of production. In addition, they have improved core and casting quality from the standpoint of both engineering requirements and appearance. Other benefits are their flexibility and influence on standardization of core-making processes.

The advantages are accompanied by increased core box making and maintenance costs, and machine down-time and maintenance costs are not yet at a satisfactory level.

However, the automatic core blower has solved for the Cadillac foundry the problem it was intended to solve.

JOSEPH L. BROOKS / *Director of Metallurgy*
Sparta Div., Muskegon Piston Ring Co., Sparta, Mich.

Holding Blast Humidity Constant

Moisture content of the cupola blast has definite effects on the properties of the melt. This paper describes certain of these effects and tells how Muskegon Piston Ring Co. maintains a constant cupola blast moisture. This has eliminated one troublesome variable in the making of consistent quality iron.

■ It is common knowledge that certain fluctuations occur in cupola operation which cannot be attributed to blast air pressure variation. It has been noted that these differences happen between wet and dry days and between summer and winter. As long ago as June 11, 1800, the following was noted in a paper by Dawson:[1] "In the summer season we all know that the furnaces never work quite so well as at any other time. A change from dry to moist air has sometimes reduced our charges four or five in 24 hours and changed the metal from rich No. 1 to very indifferent No. 2."

From that day to this, numerous references have been made in foundry journals to these same facts—lowered melting rate and changed metal quality due to an increase in the moisture content of the air blast.

These factors are so well recognized that it has become good practice in the operation of some cupolas to take periodic moisture readings of the air blast. On the basis of this content an adjustment is made in the coke charge along with the necessary air volume change of the air. This procedure requires constant attention and supervision to insure satisfactory results. Some little time is required to stabilize conditions when a change is necessary. The more frequent the changes—found necessary when the moisture content varies widely—the more difficult it is to produce iron of uniform and satisfactory quality.

A chart has been prepared by Battelle Memorial Institute (Fig. 1) which graphically shows the amount of coke that must be added to the base charge with an increase of moisture. For example, a cupola using 11,000 cu ft of air per min containing 7 grains of water per cu ft will require 800 lb of additional coke per hr. At 10 gr/cu ft, 1200 lb of coke per hr must be added to the base charge. Such fluctuations as 6 to 10 gr can be

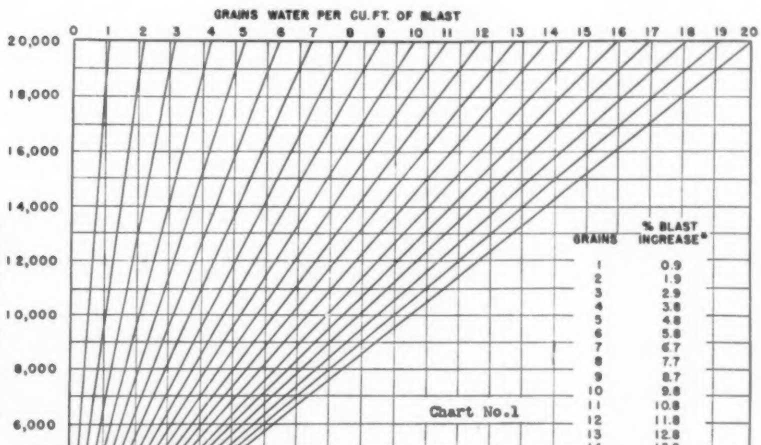


Fig. 1 . . Chart shows coke to be added to base charge to compensate for moisture in the blast. Author found control of moisture at 3 gr/cu ft gave better results than attempting to compensate for it with additional coke.

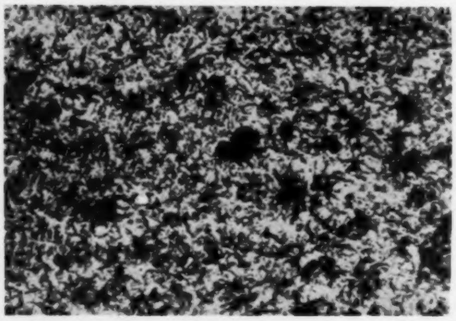


Fig. 2A

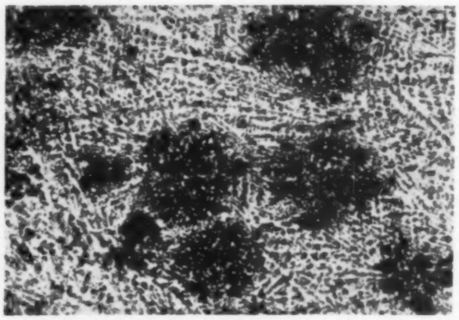


Fig. 2B

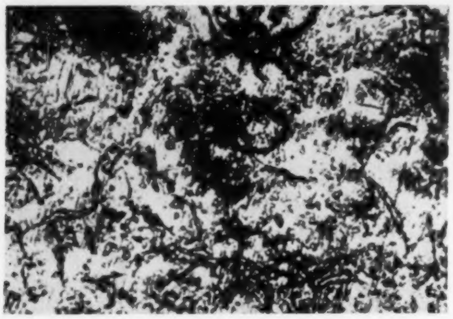


Fig. 3A

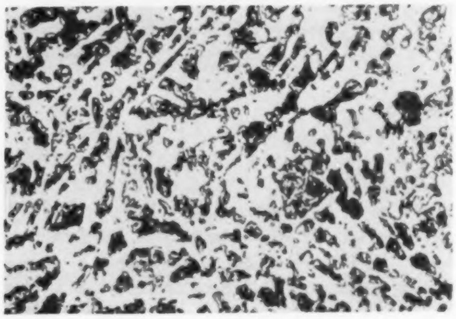


Fig. 3B

Effect of blast moisture on microstructure. 2A and 3A had 3 gr/cu ft; 2B and 3B had 10 gr/cu ft.

observed sometimes within a single day. It is apparent from this chart that an increase of moisture content in the air blast will require the use of more coke per charge to maintain the metal temperature and secure iron of reasonably constant composition.

Increasing the coke charge has far reaching effects on the entire cupola operation. Additional carbon must be supplied to react with the oxygen of the water. Since heat is necessary to produce this reaction the temperature of the metal is affected.

"The temperature of the metal in the cupola is the main factor controlling melting rate, composition, and properties. Increases in the moisture content of the air blast cause a decrease in metal temperature and melting rate and increased manganese and silicon losses. Lower carbon contents were obtained with high moisture of air and chill increases with decrease in carbon and silicon contents." The foregoing is an extract from the paper of Eash and Smith.[2] A 100 to 150 F higher metal temperature, possible with preheated air, was reported. The difference was about 60 F for high moisture air.

Flanders[3] has also reported on this loss in maximum combustion temperatures as moisture content increases. In this paper the effect of preheating the air blast to overcome this detriment is graphically shown. However, as he states, preheating does not overcome the other effects of moisture on castings.

Moisture content also affects the chemical analysis of gray iron. The result of a run in a cupola in which all conditions were maintained constant except the moisture content of the blast is shown in Table 1. This shows that, with increased moisture content, total carbon and silicon content decrease and combined carbon increases considerably. By actual measurement the chill depth increased from 0.75 to 1.5 in. Records show that the temperature of this metal was

Table I. . How Blast Humidity Affects Composition

Heat	Moisture gr/cu ft	TC	CC	Si	Mn	S	P
17	21.2	2.64	0.95	1.42	0.70	0.163	0.136
18	10.4	2.92	0.82	1.58	0.83	0.162	0.144
28	1.5	2.99	0.71	1.77	0.79	0.144	0.122

lowered as a result of the increase in moisture content from about 2580 to 2480 F with the higher content. Melting rate was also adversely affected.

In our own case we have found that piston rings become white and hard when the moisture content of the blast increases above a certain minimum. Structures resulting are shown in Fig. 2 and 3. As far as we know, the only variable changed in the making of these two samples was the blast air moisture. This content was 3 gr/cu ft for the iron in *a* and 10 gr/cu ft in *b*. Therefore, the marked increase in cementite in the *b* samples is attributed to the increased blast moisture. Of course, cupola operation can be adjusted to compensate for these adverse characteristics as soon as detected. However, each additional adjustment required increases the chances of producing unsatisfactory metal.

Perhaps the most detailed report on the effects of moisture content of the blast upon cupola operation and metal properties was that presented by Krause and Lownie[4] in 1949 at the 53rd Annual AFS Convention. This report was based on the experimental work performed in a 10-in. diameter cupola developed jointly by Battelle Memorial Institute and the Gray Iron Research Institute. Seventeen heats were made, varying from one to four hours in length with various coke ratios and blast rates. Moisture content was controlled by equipment described later at various levels from 27 to 219 gr per lb.

Increased moisture content, it was found, significantly decreased tapping temperatures and carbon pick up. Changes in chemical composition which resulted from a change in air moisture content caused appreciable changes in mechanical properties, chill depth, fluidity, and iron microstructure. Adjustments of coke ratio and air blast were found to produce a partial compensation for the detrimental effects of high moisture in the blast. Such partial compensation, however, was generally inadequate.

The Sparta Div. of Muskegon Piston Ring Co. has for many years recognized these deleterious effects of varying moisture content upon cupola operations. In the summer of 1927 an ice machine was installed to reduce atmospheric moisture in the cupola blast by refrigeration. Although of a now obsolete design, the successful operation of this machine clearly demonstrated the benefits of moisture removal in cupola blast. About this time other piston ring casting producers also recognized the detrimental effects of moisture in cupola blast and took similar steps to rectify.[5]

A more direct attack on atmospheric moisture was made by the use of certain solid adsorbents. These systems functioned by switching automatically the flow of air from one bed of solid adsorbent material to another on a definite schedule. While one bed was removing moisture from the air, another bed was being reconditioned by heating. In 1931, equipment of that type was installed in conjunction with the hot blast system. The equipment was far superior to the old refrigeration system resulting in closer control and lower operating costs.

In 1940 a solution absorption type dehumidifier was purchased. It has since been used to maintain the moisture content of the blast at a constant 3 gr per cu ft. This system employs a lithium chloride base solution as an air washer to remove the moisture from the blast air to any desired level. The equipment is automatic in its dehumidification operation. Regeneration of the absorbent solution is also continual and automatic. We installed additional units on the cupolas in Foundry No. 2 and No. 3 in 1943 and in 1948. The original unit, placed in operation in 1940 is still being used. Figure 4 is a photograph of the unit installed in Foundry No. 2 in 1948.

Shown schematically in Fig. 5 is the summer cycle flow diagram of this unit. When operating at maximum design load, the 2200 cfm of air handled enters the system at 95 F, 144 gr/lb (10 gr/cu ft). After filtering, the air is passed into the air washer section of the unit where it is dehumidified to 40 gr/lb (3 gr/cu ft) and 75 F. The temperature and rate of coolant flow regulate the amount of dehumidification to be performed by the lithium chloride base solution. At Muskegon, when operating at maximum conditions, 26 gpm of 55 F water are used.

After dehumidification the air is reheated to 105 F by an afterheating coil using, in this instance, 66 lb/hr of 15 psig steam. The 2200 cfm of air is then circulated to the hot blast system.

Regeneration is accomplished simply and automatically. A small portion of the solution, about 10 to 15 per cent, is pumped continuously to the regenerator section of the unit. There the solution is sprayed over low pressure steam coils. This raises the solution temperature, forcing it to give off the absorbed moisture. The excess moisture is then picked up by a scavenger air stream and purged to the outside. At Muskegon, for this maximum summer cycle, 440 lb/hr of 15 psig steam would be used. Of course, when demand was less than maximum, proportionally smaller amounts of both steam and water are used.

Since 1927, Sparta Div. of Muskegon Piston Ring has been seeking a moisture control method which would year round maintain the moisture content of the cupola blast at 3 gr/cu ft. Uniformity of moisture content has been found to be more important than bone dryness. We have settled on direct absorption of the moisture in a lithium chloride base solution as the most practical from an economic and a performance standpoint.

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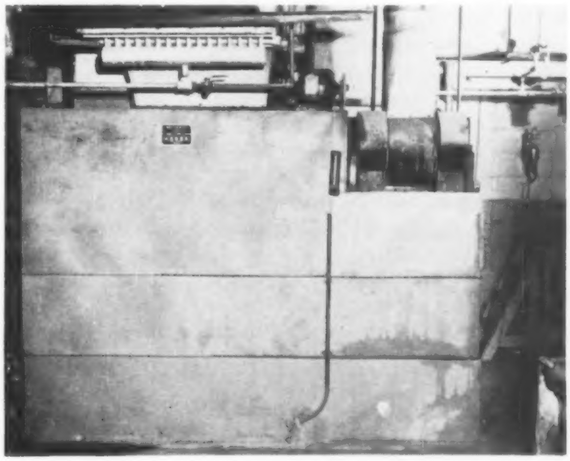

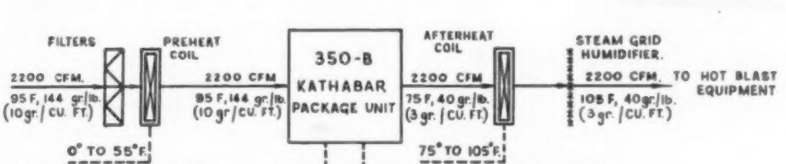

Fig. 4 (above) . . Solution absorption type of dehumidifier used in author's foundry.

Fig. 5 (left) . . Flow diagram for summer cycle of dehumidifier shown above.

Letter on pH Control...

How Clay and Sand React to Soda Ash

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■ After reading the Round Table cussion of *"pH Control of Foundry Sand"* in the September 1954 issue of AMERICAN FOUNDRYMAN, I was impressed by the general agreement that if proper control of pH was maintained during the molding operation, beneficial results were obtained. I was also deeply impressed by the general lack of information regarding the fundamental principles involved when sodium carbonate or some other agent is added to foundry sand to improve some of its properties.

About six years ago I suggested to Bradley Booth of Carpenter Bros., Inc., Milwaukee, that for a thesis subject he study the effect of sodium carbonate additions to foundry sand. This suggestion was made because of information obtained in a study made at the University of Wisconsin of the effects of addition of sodium carbonate to clays. In this study[1, 2, 3] it was discovered that very small additions of sodium carbonate to clays drastically changed their physical properties. At first, tests on clays could not be duplicated because of uncontrolled variables. It was necessary to adopt some standard of measurement and for this purpose a pH meter was used.

Since molding sands usually contain natural clay or bentonite for binding purposes it is only natural to assume that if the clay in the sand is treated in the same manner as clay used for other purposes the same beneficial effects should be secured. And so "pH control of foundry sand" was born.

Some foundrymen are confused as to the meaning of pH. Actually pH is an arbitrary scale which has been adopted to measure hydrogen concentration and is used in much the same manner as a Fahrenheit scale is used to measure temperature. The numbering of the scale is from one to 14; seven is the neutral point. Any number below seven means the mass tested is acid and any reading above seven indicates alkalinity or a basic condition. The scale is logarithmic which means the concentration as measured is ten times greater than the number before it reading either way from the neutral point of seven. Actually the meaning of the scale itself can be forgotten in most cases if the reading on the scale is used as a reference point.

Few foundrymen understand what happens when sodium carbonate is added to their mixes. Molding sands contain some clay for binding purposes; bentonites are considered clay. All clays contain some colloidal size material which is too fine to measure accurately. This colloidal material is responsible for the bonding power and stickiness of clay. It is a complex material consisting mainly of hydrous aluminous silicates.

The colloidal material also contains a small fraction of matter called base exchange material. This base exchange material is a very important ingredient because it controls the physical properties of the clays. Investigators have listed three important base exchange types as follows:

$$CaO \cdot 4Al_2O_3 \cdot 16SiO_2 \cdot xH_2O$$
(exchange saturated with calcium)

$$Na_2O \cdot 4Al_2O_3 \cdot 16SiO_2 \cdot xH_2O$$
(exchange saturated with sodium)

$$H_2O \cdot 4Al_2O_3 \cdot 16SiO_2 \cdot xH_2O$$
(exchange saturated with hydrogen)

Because the colloidal material in clays contains the base exchange compounds, it has a pronounced effect on the total mass. If the base exchange compounds flocculate, the entire mass has a tendency to flocculate and if the exchange compound deflocculates, the mass also tends to deflocculate.

When saturated with calcium, the compounds deflocculate with difficulty but flocculate or coagulate easily. When the compound is saturated with sodium it deflocculates easily. This is the property

which makes the molding sand flow more readily with less water. It also accounts for higher dry strength because the sand grains are better coated with the clay binding material. It also accounts for the lower green strength because the binding material is more slippery and less adhesive.

The problem then is to add just enough sodium carbonate to remove the calcium content in the base exchange material and replace it with sodium. The reaction involved with a high lime clay may be represented as follows:

$$CaO \cdot 4Al_2O_3 \cdot 16SiO_2 \cdot xH_2O + Na_2CO_3 = CaCO_3 + Na_2O \cdot 4Al_2O_3 \cdot 16SiO_2 \cdot xH_2O$$

Clays containing the acid base material will also be improved in workability if the acid radical is replaced by sodium as follows:

$$H_2O \cdot 4Al_2O_3 \cdot 16SiO_2 \cdot xH_2O + Na_2CO_3 = H_2CO_3 + Na_2O \cdot 4Al_2O_3 \cdot 16SiO_2 \cdot xH_2O$$

The acid clays do not coagulate as easily as calcium base clays. For this reason workability of lime clays could be improved by the addition of sulphuric or hydrochloric acid. This treatment is messy and does not give the best results obtainable. It is, therefore, better and cheaper to treat with Na_2CO_3.

Because molding sands contain only small percentages of clay and only a fraction of the clay consists of base exchange material, the total amount of sodium carbonate added must be small. It is a mistake to think that because a little makes the sand mold better, a lot will give more improvement. Actually, if an excessive amount is added all beneficial results will be lost and the molding and other properties may be worse than they were if no treatment were given. This is because over-treatment causes coagulation of the clay and the benefits of dispersion are lost.

Earlier investigations have proved that pH control could not be secured by the addition of definite amounts of basic materials to clays to produce the most beneficial results. Molding sands vary in the amount of clay material contained and the type and quantity of base exchange in the clay content also vary. Because certain constituents of various clays in molding sand buffer the action of basic materials, the necessary reaction range can not be attained through the addition of a definite weight of basic material per ton of clay, based on the original pH of the molding sand. Two different molding sands might have the same pH but the amount of addition reagent required may be twice as much for one as the other.

In view of this, it is necessary to find a satisfactory method for determining the active acidity or alkalinity of the molding sand. A hydrogen-ion electrometer will give accurate results if used carefully and certain precautions taken. It has been determined that colorimetric methods of determining pH are not accurate enough for good control testing.

One method of testing found satisfactory is to add 20 g of sand to 40 ml of water in a beaker. Stir well and then add a solution of known sodium carbonate percentage to the mixture. Read the pH of each addition after stirring and then plot the results on graph paper. Plot pH obtained against per cent of sodium carbonate added. The curve usually is regular with a break occurring at some point. This break will indicate the per cent of sodium carbonate which should be added. After each reading it is imperative to wash the electrode well and wipe it with a piece of clean, soft tissue.

If above theory of base exchange is correct then no beneficial effects would be expected when used on core sands if these do not contain some clay material. If experimental results indicate improvement to pure quartz grains then some additional factors are involved and these should be investigated.

Proper pH control produces better flowability of the sand mix. Before control was established, it may have been customary to bump the sand in the mold 12 times for proper packing to produce the required hardness. After control, the same hardness might be attained by eight bumps and if 12 bumps were given, as was the previous custom, the mold would be too hard for good service. Also, if the grain fineness of the sand varies, it will be necessary to adjust the molding procedure even though no change has been made in the pH of the sand mixture.

The matter of quantity of mixing water is important and may need to be decreased. Usually less mixing water will be required when the pH has been properly adjusted. The question then is not one of pH control only but equally important is the adjustment of the molding procedure after pH control has been established.

Bentonites are commonly used for bonding formulated molding sands. All bentonites contain considerable amounts of base exchange material. Some contain natural sodium exchange base. Others contain an acid base and some have a calcium base. If bentonites were treated so the base exchange was always saturated with sodium, they would be more uniform in character and give more uniform results when used in molding sands.

In making laboratory tests for control purposes it is advisable to use distilled water even though this is not the water used in the plant. By using distilled water comparisons are reproducible. Mixing water in the plant will frequently contain chlorine and some adjustments between the laboratory and plant will have to be made. Chlorides in the clays or in the water do affect the degree of base exchange. There may be some slight change in the chlorine content of the water from day to day but this usually can be ignored. Sodium chloride in small amounts is extremely detrimental to the control. Precautions should therefore be taken to keep salts out of the molding sands. This is especially true in winter when calcium chloride contamination may occur.

In conclusion, it may be predicted that when pH control is used in a foundry, beneficial results will be obtained only when all the factors mentioned, and some others not mentioned, are also controlled.

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Smog Control in the Foundry

Aisle inside one of four sections of bag house for foundry smog.

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Los Angeles Steel Casting Co.

Construction and operating details of a collection system for an electric steel foundry are told in this story presented at a meeting of SFSA.

■ Smog control means collection of smoke, fumes, and dust and holding the volume escaping into the atmosphere within the allowable limits as prescribed by the law. The Los Angeles County Air Pollution Control Board has established rules and standards and all industrial collecting equipment must operate within these standards before a permit to operate is granted. These permits are revokable whenever the collection equipment fails to perform properly. This means not only that suitable equipment must be installed initially, but also that it must be maintained in perfect working order.

Before a permit for any new installation involving a process that generates smoke, dust, or fumes is granted by the Air Pollution Control Div., a complete description of the process and the equipment together with installation drawings must be submitted for their approval. When the air pollution engineers are convinced that the equipment has a reasonable chance to perform satisfactorily, an installation permit is granted. After the equipment is installed and in operation Air Pollution inspectors and engineers make a visual inspection of the exhaust stacks. If there is any question as to the amount of smoke, fumes, or particulate matter issuing from the stacks, the Air Pollution representatives (after satisfying themselves that the installation has been constructed in accordance with the plans submitted to them and upon which the installation permit was based) conduct tests to determine whether the actual performance is within the limits of the Air Pollution Control Law. If not, the installation must be adjusted until it does meet the requirements; only then is an operating permit granted.

From then on the equipment is watched by the Air Pollution Control inspectors to make certain that it continues to function within the law.

In the foundry, several operations generate air pollutants. The pattern shop and carpenter shop problem is due mainly to saw dust, shavings, and dust from the sanders. Most modern machines have built-in dust hoods and these are connected to collection systems. For this application cyclone collectors are satisfactory and do a good job. There is a fire hazard but not much can go wrong with a cyclone installation, therefore the hazard is not great.

Branch pipes leading from the machines should run into a trap before entering the main duct and should

run under floor level to keep them out of the way. Traps pay off. They collect heavy pieces of wood that could clog the ducts and should be built so that they may be cleaned out easily and so that floor sweepings can be swept directly into them. The branch pipes should operate at a velocity of approximately 4000 fpm, to insure good collection at the point of operation and the main duct at the rate of 3000 fpm to insure conveying the material into the cyclone.

Another problem is the collection of dust generated in grinding operations, sand blasting, and shot blasting. The types of dust from these operations are practically identical. They consist of steel particles, fine sand, and the fine particles of the grinding wheels. Such dust has been collected for years.

Sand reclaiming systems pose another problem. Los Angeles Steel Casting Co. uses a sand cooling tower and mixes the hot air coming from the tower with the exhaust air from the two shake-out machines. This air —carrying the dust, fine sand, spent clay and a small amount of smoke—travels through about 100 ft of duct before reaching the wet collectors. Frequent inspections of the duct are made; dust or sand have never been found.

A wet system is used because of the moisture coming from the shake-out operation. There are two settling tanks and the overflow is re-circulated through the collector. The tanks are used alternately every other 24 hr. By the end of the day the sludge contains about 15 per cent solids which is hard on the pumps and causes excessive wear.

Probably the most difficult problem is collection of dust and smoke from the electric furnaces. This involves not only material less than one-half micron in size, but high temperatures. Initially a small bag house was tried. It did a fair job of collecting but it had not been in service more than a few weeks when the bags became charred from the high temperature of the gases. Next attempts to solve this problem involved two types of wet collectors neither of which would meet Los Angeles Air Pollution requirements. Regardless of the fact that the exhaust gases passed through water and water sprays, it was not possible to wet the dust. Effect of wetting agents was not noticeable. The dust even went through a heavy foam blanket.

When it became evident that wet systems would not do the job required in Los Angeles, the electronic precipitator was considered. Samples of the dust and smoke were collected and submitted to an electronic precipitation manufacturer. Much to everyone's surprise the material in the dry state went right through the electronic precipitator. To use the electronic method the manufacturer advised, moisture would have to be introduced into the system to wet the material. Experience with wet collectors left a great deal of doubt as to whether or not this could be done.

In addition to the wetting problem, it was found that acid was being picked up in the re-circulated water to such an extent that the steel sheets in the wet collectors were badly corroded. This, in spite of the fact that sulphur cannot be removed from steel under the acid process of melting. The acid problem indicated a need for wood construction, another reason why this type of collector was discarded.

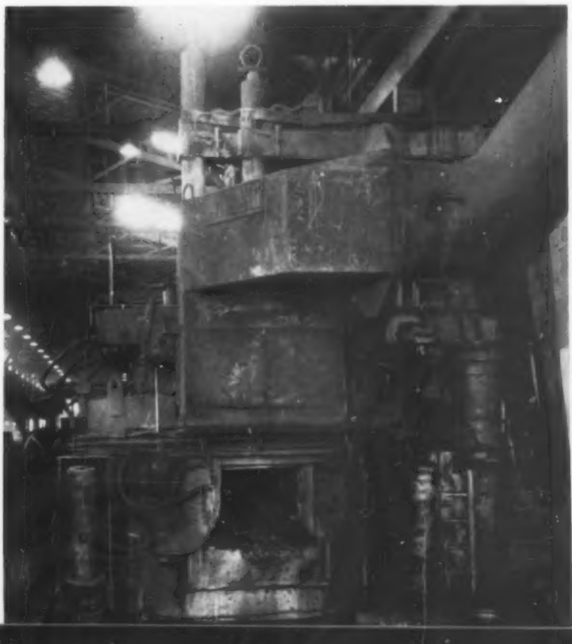
This left one solution—a dry system using some type of bag house. At this point, an engineer with wide experience in the dust collecting field was called in. He worked on the development of the bag house installation which finally solved the problem.

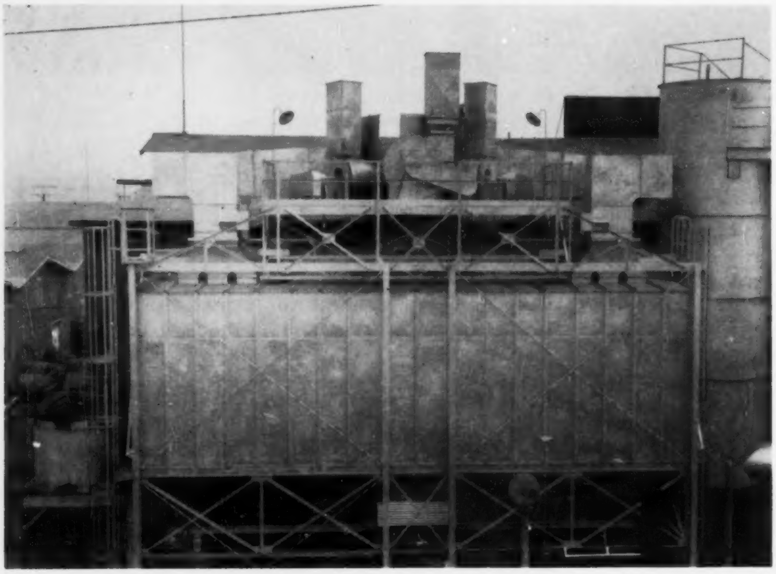
The wet collectors used in the first installation met the process weight requirement in that the percentage by weight escaping to the atmosphere was within the limits of the local air pollution regulation. But they failed in that the density of the exhaust smoke did not meet the Ringelmann test requirements.

Process weight per hour is the total weight of all the material (including solid fuels) introduced into any specific process which may cause any discharge into the atmosphere. For instance, in the case of one of the company's electric furnaces, the scrap charge is 12,000 lb and the melting time from charge to comple-

Furnace hood on spout side of electric furnace . . .

. . . and as it appears from charging door side.





Left . . Bag house unit has all fans located on top of house out of way.

Right . . Plan of duct work for exhausting four furnaces into bag house.

Below . . Collector instrument panel.

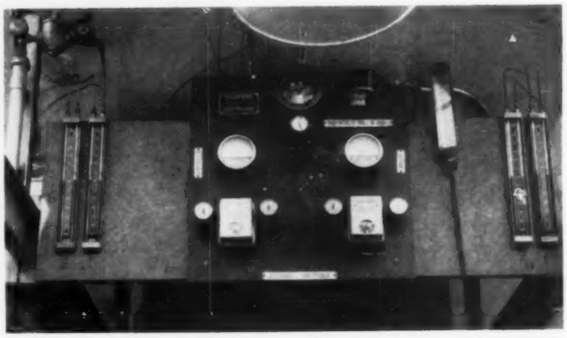
tion of the heat is 2 hr. The process weight is then 6000 lb per hr. The allowable discharge into the atmosphere for this process weight taken from Los Angeles Air Pollution control charts is 7.37 lb per hr.

The first bag house tested, which has been mentioned before and which eventually burned, taught several things about the problem. Records of exhaust air from all four furnaces showed 112 F dry bulb and 76 F wet bulb with peaks as high as 350 F dry bulb. The peaks occurred when the hot electrodes were being raised out of the furnaces just after tapping the heat. The hot part of the electrode, being in the hood with electrode temperatures as high as 2000 F, heated the air drawn in around the roof hoods to 350 F. Addition of outside air when the temperature went up, by opening slides or dampers in the duct work, was expected to enable operation without burning the cotton bags in the filter.

The unit did a good, clean job about long enough to rate an operating permit. The shaking mechanism did not shake hard enough to clean the bags and the bags clogged up. The only way to keep the bags clean was to blow them off manually with compressed air. Nevertheless, when the bags clogged up the temperature built up and the bags charred and disintegrated. At least this established that some type of bag house would do the job—provided the bags would shake clean and could be protected from high temperatures.

With this experience, the problem was: to find a type of bag house that would shake the material off the bags; a method to automatically control temperature within a range the bags would take without charring; and a type of material that would collect the dust but release it when the bags were shaken. The smoke and dust being collected tended to cake and stick to the bags like grease.

Next a small unit in which the dust was blown off the bags by back pressure was tried. The material was collected on the outside of the bags, then the flow of air was reversed, the bags were blown up like a balloon, and the dust cake was supposed to be blown loose. Unfortunately, when the bags were inflated

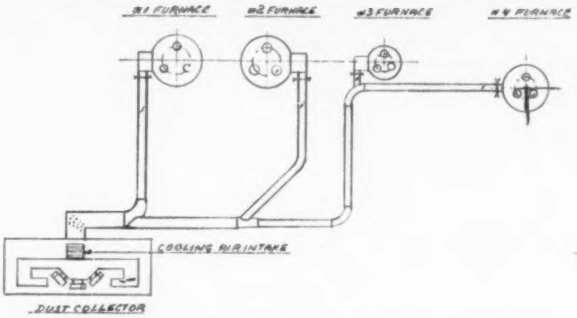


some of the dust cake would come off but most of it stuck; unless the cake was over $1/16$ in. thick none of it came off the bags.

It was thought that the material used to make the bags had a great deal to do with the sticking problem, so bags of cotton, wool, and orlon were tried. Best results were obtained with orlon with no nap on either side. Orlon bags with no nap were finally selected because the nap seemed to have much to do with sticking, and it was known that orlon would stand higher temperatures than other materials then available.

A small tubular bag type of collector, shaken from the top, was borrowed. This collector had cotton bags with nap on the inside and it was found the dust could be shaken off the bags, although it took at least 10 min shaking to clean them up. Collection would start with a 2 in. water gauge differential across the bags and in about an hour this would build up to 7 in. on the water gauge; 10 min shaking would reestablish the 2 in. gauge differential.

The final installation selected was manufactured in accordance with specifications worked out with the consultant. It has operated perfectly over a year. The first specification adopted called for a fully automatic shaking mechanism to be controlled by timers and dampers admitting outside air automatically controlled by thermostats located in the bag house.



Tubular orlon bags with no nap on either side were specified, along with control equipment to keep temperatures below the danger point.

Knowing that the dust would cake and pack easily, a ratio of no more than 2 cu ft of air per square foot of cloth was specified. The higher ratio the harder the dust would cake on the bags, making it difficult to shake off and requiring a longer shaking cycle.

Air volumes selected by experience on the wet collectors were as follows:

No. 1 Furnace—6-ton, 9-ft diameter shell, 9-in. brick lining, basic. Manufacturer recommended exhausting furnace at 17,000 cfm. Due to hood construction which left large holes in the sides to accommodate roof-raising mechanism a 30-in. diameter duct was used. Air volume at 20,850 cfm is much more than recommended, but as long as cooling with added air was planned it could just as well come in around the furnace roof and help keep the hood cool.

No. 2 Furnace—9-ft diameter shell, 12-in. brick lining, acid, door charge, well-fitting hood, 24-in. diameter duct. Air volume 8000 cfm.

No. 3 and 4 Furnaces—Both exhausted into a 20-in. diameter main duct. Air volume 12,600 cfm. No. 3—5-ft diameter shell, 9-in. brick lining, basic, door charge, well-fitting hood, 12-in. diameter duct. No. 4—6-ft diameter shell, 9-in. brick lining, acid, top charge, well-fitting hood, 16-in. diameter duct.

Total air volume for the four furnaces is 41,450 cfm which with an estimated 8550 cfm cooling air comes to 50,000 cfm. Two fans with 50 hp motors and 25,000 cfm capacity and a standby fan with 30 hp motor and 12,000 cfm capacity were selected.

The collector designed with the preceding factors in mind was constructed with a four-section bag house. Dust-laden air enters a classifier section and is distributed into the four sections. Each section may be closed off individually in case a repair job is necessary, and there is ample capacity to operate on only three sections. Shaking mechanism is electrically controlled by a timer and each section shakes 10 sec per hr. The section shaking is under back pressure across the bags and the incoming dust is collected by the other three sections.

Cloth area in the four sections totals 26,174 sq ft, giving a ratio of 1.91 cu ft of air per square foot of cloth. In three sections, total area is 19,632 sq ft and the ratio is 2.54.

Each duct leading from the furnaces was provided with a damper to balance the air flow in the system, and to enable each furnace to be regulated so as not to draw any more air than necessary to exhaust the furnace properly. If one furnace should be shut down for some time the damper may be closed. If two furnaces should be down, both dampers can be closed and one fan shut down. Sliding gates in front of the intake of each 25,000-cfm fan enables them to be shut off in case of failure or a shut down of one or more furnaces. The outside air intake damper, located in the classifier, has a 48 x 48-in. frame with 6-in. wide damper sections, shafts extending outside the frame, and all connected by levers to one arm.

The sections are operated by a modulating control set to start operating at 175 F. Thermocouples are located in the center of the classifier. The higher the temperature rises, the more the intake damper sections open; if the temperature should reach 212 F the damper would be wide open. The 12,000-cfm fan is electrically interlocked with this damper and will start if the damper opens wide.

The same sort of closing damper, mounted on the exhaust of the standby fan, opens when the fan starts. It is interlocked with the air intake damper and closes as soon as the fan stops again so no air can be taken in when the fan is off. While the smaller fan is primarily intended as a safety feature in case of a hot flash, it is also good in case of failure of one of the large fans or motors.

When the collector was put into service, all dampers were left wide open and adjustments were made until each furnace was exhausted properly. After a 24-hr run, readings were taken of temperature and air volume in each duct. Air volumes were taken by pitot tube. The following data were collected:

No. 1 Furnace—160 F, 30-in. duct, 0.854 velocity pressure, 3700 fpm, air volume 17,254 cfm.

No. 2 Furnace—108 F, 24-in. duct, 0.755 velocity pressure, 3480 fpm, air volume 10,934 cfm.

No. 3 and No. 4—Combined duct for both 20-in. diameter (No. 3 cold but damper open), 114 F, 1.195 velocity pressure, 4380 fpm, air volume 9557 cfm.

Total air volume was 37,745 cfm and average temperature was 127.3 F.

Several adjustments were made later and in the meantime it was necessary to screen the intakes because the furnace operators would lose their hats in the furnace exhaust pipes. Screen used was 1-in. expanded metal. Pitot tube readings taken after screening and readjusting gave 19,759 cfm (No. 1), 11,625 cfm (No. 2), and 8147 cfm (No. 3 and No. 4), a total of 39,531 cfm. This leaves about 10,000 cfm for cooling air before reaching the capacity of the collector.

By running all the furnaces into one collector, they help cool each other. They are seldom at the hot stage at the same time. Observation and temperature records of the collector indicate that added air is seldom needed unless two furnaces should be tapped at the same time so both have hot electrodes in the hood. This makes for a hot spot until air circulating around the hot portions of the electrodes cools them off.

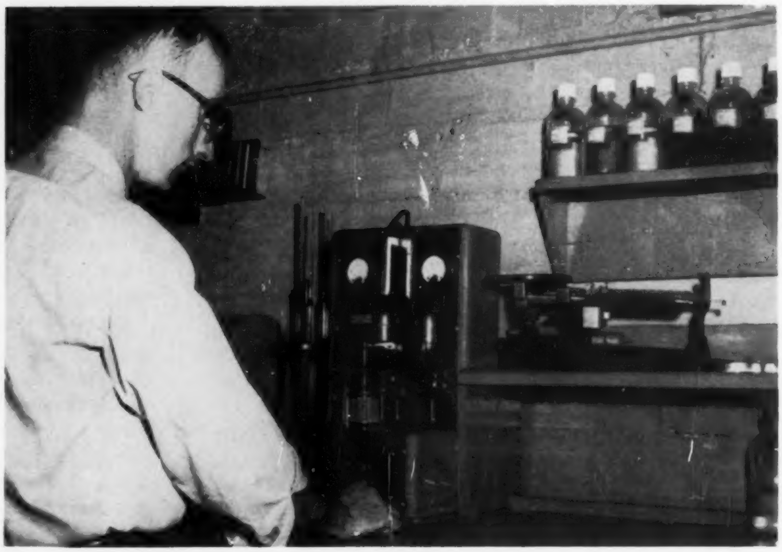
Adjustment for oxygen blows is made when necessary. This calls for opening the dampers a little more to take care of the heavy smoke created. Temperature in the baghouse rises about 10 F above the temperature it is running at that time. No smoke is visible from the exhaust stacks.

Rapid Electrolytic Analysis of

Tin and Antimony in Lead-Base and Babbitt Alloys

EDWARD H. HUSS / *Metallurgical Dept., Viking Pump Co., Cedar Falls, Iowa*

A method for the determination of tin and antimony in lead-base and babbitt alloys is more rapid than the conventional analysis because it utilizes the solution remaining from the antimony separation for the tin determination.



Edward H. Huss follows progress of electrolytic determination.

Procedure for Antimony. Dissolve 1 g of sample in 30 ml aqua regia (1 part HNO_3 to 3 parts HCl). When solution is complete, add 30 per cent sodium hydroxide until alkaline, and then add 5 g sodium sulphide. Heat the solution until precipitated sulphides of copper, lead, and iron coagulate; filter through a #42 Whatman filter paper, washing precipitate with a 2 per cent solution of sodium sulphide.

The arsenic, antimony, and tin will all be in the solution as sulphides, while the copper, lead, and iron will be the precipitate on the filter paper. To the filtrate add 1.5 g sodium hydroxide and heat to boiling. Electrolyze hot with a current of 2.5 amp. About 0.25 g of antimony will be deposited on the cathode in 30 min. With care, 1 g of metal can be deposited accurately.

Wash cathode and anode with distilled water and retain the solution from which the antimony was separated. Rinse the cathode in clean methyl or ethyl alcohol and dry. The difference in weight of the cathode will be the antimony content of the alloy. To remove the antimony deposit on the cathode, use equal parts of 1:1 nitric acid and a 25 per cent solution of tartaric acid.

Tin Determination. To the solution retained from the antimony separation, add 40 ml of 1:1 HCl to precipitate the combined sulphides of arsenic and tin. Allow this solution to stand one hour to make the sulphides more easily handled. Filter through a #42 Whatman filter paper, washing with a 1 per cent solution of ammonium nitrate. Remove the beaker containing the solution from the arsenic and tin separation and substitute a clean, empty 250 ml beaker.

To the arsenic and tin sulphides in the filter paper, add a 15 per cent solution of sodium hydroxide to dissolve the precipitate. To the solution in the beaker, add sodium peroxide—a little at a time—until the solution is colorless, boil for 15 min and add oxalic acid to the hot solution until litmus paper turns red; then add 4 g in excess.

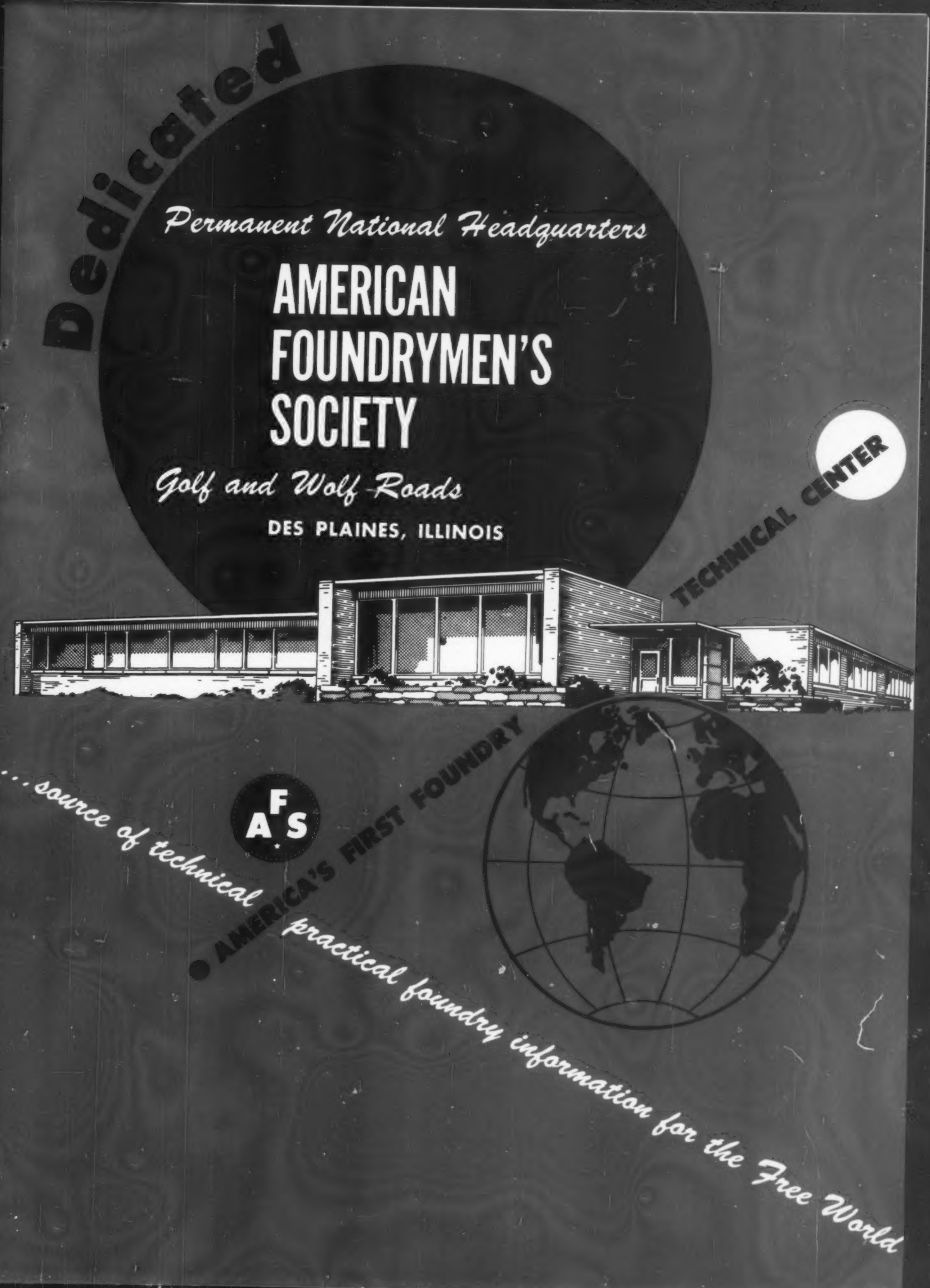
Dilute the solution to 200 ml with hot water and gas with hydrogen sulphide for 30 min to precipitate arsenic. Filter arsenic through a #42 Whatman paper, leaving tin in solution; wash with hot water.

Concentrate the filtrate and washings from the precipitated arsenic sulphide to a volume of approximately 200 ml and electrolyze with a copper-plated cathode at a current of 2.5 amp. Electrolyze till the solution is alkaline. Remove the cathode from solution and wash with distilled water, and finally, with methyl or ethyl alcohol. The difference in weight of the cathode is the tin content of the alloy.

The tin may be removed from the electrode with a 1:1 nitric acid solution containing an excess of oxalic acid.

The following table illustrates the results obtained with this method of analysis.

Standard Sample No.	Present Sn, %	Present Sb, %	Obtained Sn, %	Obtained Sb, %
53b	5.06	10.28	5.03	10.30
54c	86.32	7.27	86.29	7.26
127	34.88	0.75	34.85	0.75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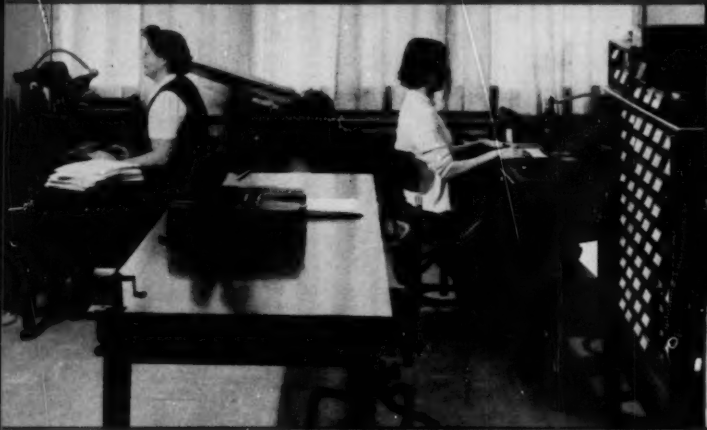


THE
UNDRY
DUSTRY

. . . Dedicated to the Needs of a Progressive Membership

Floor plan of the new AFS Headquarters—11,139 square feet on one floor, arranged for efficiency and control, utilizing fully an excellent due-north exposure. Units include: combined Library and Conference Room; large Stockroom; facilities for reproducing bulletins and technical data, addressing and mailing; offices and semi-departmentalization of Society activities; attractive Reception Area; Employee Lunchroom. Roomy court affords daylight to all units. Entire building, with exception of Stockroom, will be air-conditioned the year 'round, heated by both forced hot-water radiant heat and circulating warm air.

Modern in Design,

functional in layout, construction is reinforced brick and concrete, completely fireproof. Materials used minimize operating and maintenance expense. Sash is extruded aluminum, requiring no painting. Wherever corrosion might occur, non-ferrous materials are used. Other details: acoustical ceilings, asphalt tile floor covering, recessed tubular lighting and air diffusers, thermopane windows, oil-fired heating plant.

Until now America,

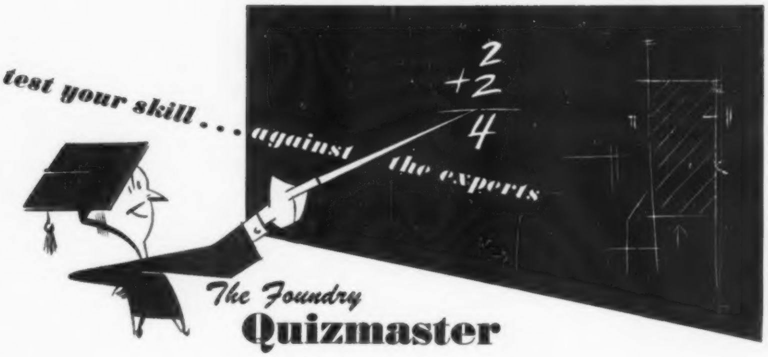
the greatest metal casting nation in the world, has not had a Foundry Technical Center. The new AFS building, therefore, reflects credit, not only on those foundry leaders with the foresight to envision a Permanent Headquarters Building as the keystone for a more useful AFS, equipped to maintain its position as a technical society devoted exclusively to education and scientific advancement . . . it is a credit to American industrial leaders.

The investment

in Permanent Headquarters is part of a carefully planned program by the AFS Board of Directors to reduce inflationary overhead expense while continuing to guide the pace of foundry technical progress.

Thus . . .

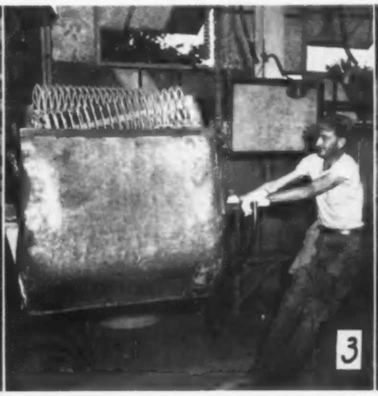
it now will be possible for AFS to broaden and strengthen its activities . . . Foundry Publications . . . Fundamental Research . . . Foundry Education . . . Technical Service . . . Technical Library . . . Safety, Hygiene and Air Pollution Control . . . Foundry Conventions and Exhibits . . . AMERICAN FOUNDRYMAN, "The Foundrymen's Own Magazine."



Test your foundry knowledge with "The Foundry Quizmaster." Your reward for taking the quiz: Increased knowledge of foundry practice. Questions this month deal entirely with safety rule violations.

How many safety violations illustrated in this month's Foundry Quizmaster can you identify? Answers: See page 90. The pictures were posed especially for Robert Beeson, Safety Supervisor, Hagertown (Ind.) Plant of Perfect Circle Corp., to illustrate infractions of plant safety rules. A posed picture showing what not to do was posted on each of the plant's 11 bulletin boards along with a list of plant safety rules. Employees were expected to be able to tell which rule was being broken if asked. Pictures were changed each week. Mr. Beeson also uses pictures of actual accident cases in which the worker was protected by proper use of safety equipment and clothing.

Safety is everybody's business! What's your safety rating?



What *IS* Silica Sand?

CLYDE A. SANDERS / *Vice-President, American Colloid Co., Chicago*

O. JAY MYERS / *Tech. Dir., Foundry Products Div., Archer-Daniels-Midland Co., Minneapolis*

The words "silica" and "sand" are used in many ways to satisfy foundry terminology. The resulting confusion should be clarified to create standardization within the industry and to eliminate the possibility of confusion in technical and promotional literature.

■ The word *silica* is used with many meanings and must be defined more clearly to be fully understood. To infer that *silica* means only *molding sand* is incorrect. Likewise, *sand* does not mean a *silica molding material* but is a general term applied to a particle size.

Sand may be not only silica, but also zircon, olivine, any ceramic material, or other finely divided unconsolidated matter. However, in the foundry industry, the term usually applies to quartz (silica) grains. Various general definitions of sand have been proposed, but all of them are open to criticism since they do not cover special applications. These definitions of sand represent foundry terminology and are not proper geological definitions.

Sand might better be defined as "the fine granular material naturally or artificially produced by the disintegration or crushing of rocks or slag." This definition, together with the chemical composition of the material, can be regarded as an adequate foundryman's description of sand.

Foundry sand definitions further break down the term *sand* to a local deposit, manufacture, or foundry need. The two broadest sub-definitions of molding sand are those called *bonded* or *unbonded*. Since molding sands rank second only to construction sands in volume of output, a careful study of their types is imperative.

Unbonded molding sand is usually made up of silica sand; however, future foundrymen may consider olivine sand or zircon sand as their base materials. It is not unlikely that certain ceramic fired sands will find their place in the foundry industry.

Although the term *silica* has been used to define the most common type of sand, there has been some confusion concerning its exact meaning.

Silica is an oxide of the element silicon. It occurs, mineralogically in many forms, the most common of which is the mineral form quartz. In the foundry, the quartz is found in nearly all molding and core sands,

Sand Definitions . . Adapted from the AFS Glossary of Foundry Terms

Sand..A loose, granular material resulting from the disintegration of rock; the term refers to the size of grain and not to mineral composition. Diameter of the individual grain can vary from approximately 6 to 270 mesh. Most foundry sands are made up principally of the mineral quartz (silica) because that is plentiful, refractory, and inexpensive.

Sand, Backing..An inexpensive sand used as a mold filler.

Sand, Bank..Sand from a bank or pit which usually contains less than 5 per cent claylike material.

Sand, Black..Sand with a carbonaceous coating or a skin desposit which usually occurs after the sand has been used at least once.

Sand, Burned..Condition in which the clay portion of the sand has been destroyed by the heat of the metal.

Sand, Burning..Formation of a hard surface on a sand casting by the reactions between the mold sand and the hot metal.

Sand Castings..Metal castings produced in sand molds.

Sand, Coated..Any sand whose grains have been coated so as to improve results obtained; thermoplastic resins are commonly used.

Sand, Core..Sand that is suitable for making cores; usually low in clay substance.

Sand, Dune..Wind-blown deposits of sand found near large bodies of water.

Sand, Facing..Specially prepared molding sand mixture used in the mold adjacent to the pattern to produce smooth casting surface.

Sand, Floor..Foundry sand which is used on the open floor with little, if any, mechanization.

Sand, Green..A naturally-bonded sand or a compounded molding sand mixture which has been tempered with water for use while still in the damp or wet condition.

Sand, Heap..Also referred to as system sand or unit sand; usually regarded as sand heaped on the foundry floor after it has been reclaimed and placed in heaps for re-use; chiefly used as backing sand.

Sand, Molding..Sands which contain over 5 per cent natural clay; usually between 10 and 20 per cent.

Sand, Naturally-Bonded..A sand containing sufficient bonding material as mined to be suitable for molding purposes.

Sand, Rebonded..Used or reclaimed molding sand restored to usable condition by the addition of new bonding material.

Sand, River..A term to identify a foundry molding or core sand which has come from deposits associated with a river.

Sand, Silica..Although most foundry sands contain a high percentage of silica, the term silica sand is generally reserved for those that show a minimum of 95 per cent silica content. Many high grade silica sands will analyze better than 99 per cent pure silica.

Sand, System..Foundry sand used for making molds and which eventually become the bulk of the sand used in the mechanical system or mechanized unit.

Sand, Synthetic..Any sand compounded from selected individual materials which, when mixed together, produce a mixture of the proper physical and mechanical properties from which to make foundry molds. *Effort is being made to discourage use of "synthetic" and to encourage use of "formulated" instead.*

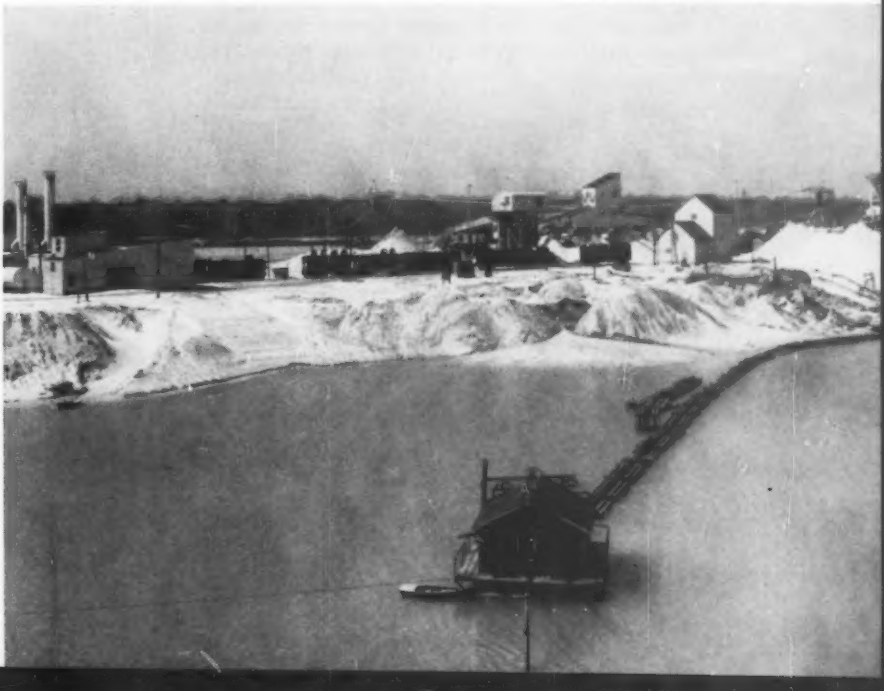
Sand, Semi-Synthetic..Part synthetic and part naturally bonded, used as a mixture.

Sand, Blended Molding..Mixtures of molding sands made to produce desirable properties.

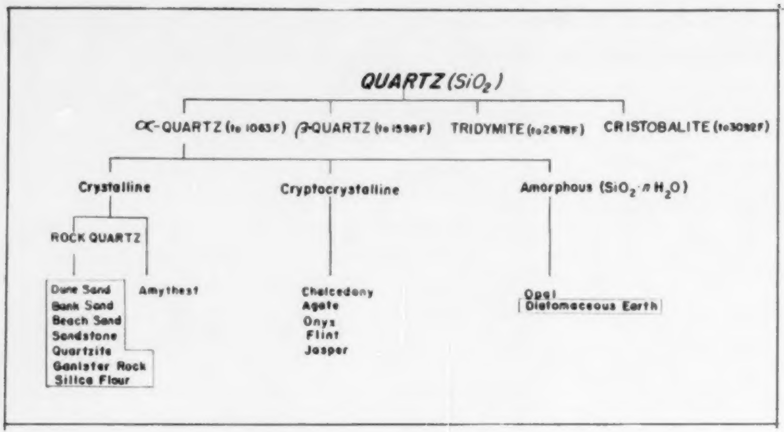
Sand, Used..Foundry sand, or a foundry sand mixture, which has been used at least once in making molds and may be used over repeatedly, or discarded.

Sand, Washed and Dried..A foundry sand which has been processed mechanically by washing, drying, and screening.

Whitehead Brothers Co.



Deposit of New Jersey silica sand with sand plant in background.



Mineralogical derivation of silica sands and other quartz products.

ganister, sandstone, silica flour, and all ceramic applications. For this reason, knowledge of silica is as important to a profit-conscious foundryman as the melting of metal.

Silica sand used by the foundryman has been selected chiefly for the following reasons:

1. Most abundant in nature.
2. Easily minded deposits universally located.
3. Low cost of production.
4. Possesses satisfactory hardness and abrasion resistance.
5. Available in a variety of grain sizes and distribution.
6. Possesses adequate resistance to metal and acid slag attack.
7. Known to be an excellent refractory and has excellent heat resistance.

Quartz, the most common form of silica, exists in two modifications—low and high temperature quartz. At temperatures below 1065 F it assumes one crystal shape, between 1063 F and 1598 F it has another. Above 1598 F a "sub-mineral" species, tridymite, is formed. Tridymite exists to 2678 F when it changes to still another form called crystobalite. One may consider quartz, tridymite, and cristobalite as polymers.

Tridymite, other than its crystalline difference, is much like quartz; however, it can be dissolved in boiling sodium carbonate while quartz cannot. It can be found (not commercially) in nature in volcanic rocks. Its name means that it usually is found as a compound polymer of three individual crystals. It has been found in meteoric iron.

Cristobalite Is Artifically Produced

Cristobalite is artificially produced from tridymite. However, there is evidence to show that quartz, as used in the foundry, goes through the tridymite-crystobalite phases at the metal-mold interface, especially when pouring high melting alloys.

While tridymite and cristobalite may exist for extended periods of time at room temperatures, the low temperature form of true quartz is the only form of silica which is found in abundance and used universally by the foundries. Among the more common types of crystalline quartz are rock crystal, amethyst, and "cats-eye."

Cryptocrystalline varieties include chalcedony, carnelian, agate, onyx, flint, and jasper. These types of quartz owe their differences to minute impurities in the original silicon dioxide composition. Even an amethyst can be thought of as a sand crystal with a trace of manganese giving it its unusual purple hue.

Still another variety of silica is opal, a colloidal or amorphous state of quartz. Although the composition of this mineral is similar to quartz, it is known to contain, in chemical combination, up to 10 per cent water. Opal is of lower hardness and specific gravity than pure quartz and is considered incapable of crystallizing. It has a sub-species known to the foundryman as diatomaceous earth, a mineral-compound of siliceous skeletons of sea organisms (diatoms). A pure "earth" contains about 94 per cent SiO_2 combined with 6 per cent H_2O; however deposits differ widely.

Silica Fuses When Heated Sufficiently

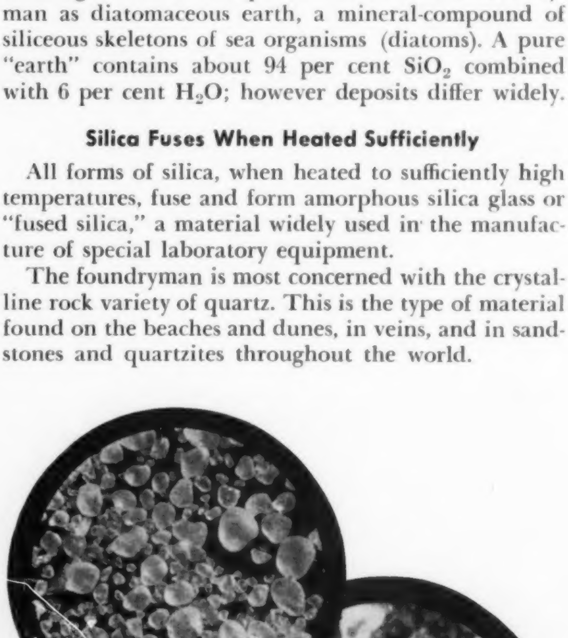
All forms of silica, when heated to sufficiently high temperatures, fuse and form amorphous silica glass or "fused silica," a material widely used in the manufacture of special laboratory equipment.

The foundryman is most concerned with the crystalline rock variety of quartz. This is the type of material found on the beaches and dunes, in veins, and in sandstones and quartzites throughout the world.

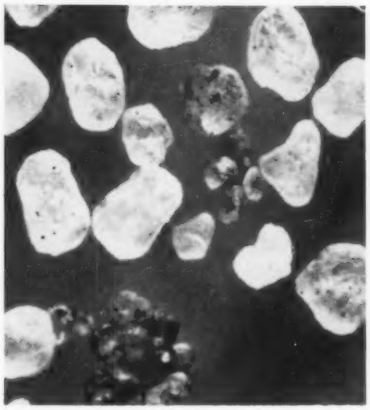
Left . . New bank sand.

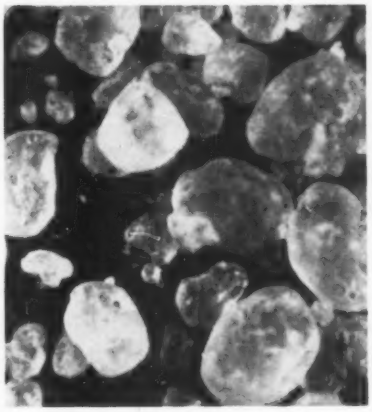
Center . . Crude silica sand.

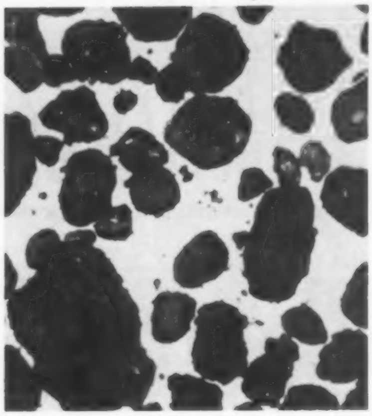
Right . . Heap sand.



Hydro-Blast Corp.







It is probably best for the foundryman that terms describing the physical state or the use to which silica is put are more likely to be chosen for practical usage than the mineralogical names. Where both mineralogical and commercial names are used, however, the mineralogical classification should be encouraged.

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Washed and dried silica sand.

Heap sand from steel foundry.

Great Lakes Foundry Sand Co.

Bank sand in pit.

For more data, circle No. 761 on postage-free Reader Service card on p. 17 or 18

How to Prevent Copper-Base Alloy Casting Defects

This description of brass and bronze casting defects and their cause and cure is adapted from the AFS publication *Copper-Base Alloys Foundry Practices.*

1. Shift. A casting in which the cope and drag portions do not match exactly at the parting line.

CAUSES . . (1) Loose and poorly aligned flask pins. (2) Improper mold handling. (3) Improper pattern equipment.

REMEDIES . . (1) Vigilant check on flask equipment. (2) Careful jacket setting on snap-flask molds. The use of banded molds on roller conveyors necessitates the use of proper rollers and careful handling. (3) Check alignment of cope and drag portions of pattern equipment.

2. Misrun. A casting which lacks completeness due to the fact that the mold cavity has not been wholly filled with metal. There may be a smoothly rounded hole through the wall of the casting, or one or more of the extremities may be only partly filled.

CAUSES . . (1) Low hydrostatic pressure. (2) Gating system. (3) Condition of sand. (4) Sluggish metal due to impurities. (5) Cold metal. (6) Interrupted or slackened pouring. (7) Broken or floating cores.

REMEDIES . . (1) Increase height of cope so that the metal in the sprue will be substantially above the highest level of the casting or castings in the mold. (2) Alter gating system to permit the free and smooth flow of metal into the mold cavities. (3) Check sand properties. High moisture has a tendency to chill the liquid metal. Low permeability and/or hard ramming will prevent the exit of the gases generated, thereby causing a back pressure, preventing the metal from completely filling the mold. (4) Check furnace practice. Proper segregation of raw material would prevent the pick-up of any harmful impurities. Proper deoxidation and skimming practice should result in a more fluid metal. (5) For a specific casting, each alloy has a definite pouring range. The first and last molds poured should be within this range. If the last molds poured contain a high percentage of misruns, it would be advantageous to reduce the number of molds poured per pot. (6) Keep sprue full at all times during pouring. (7) Weak core mixtures or the lack of core wire support may cause the cores to break and float to the cope section of the casting resulting in a defect that appears to be a misrun. Improper prints on the core or pattern and careless setting may also aggravate this condition.

3. Cold Shut. The castings appear to be cracked, but on closer examination it is found that the metal has failed to join or coalesce along the line of the apparent crack. In some cases, partial coalescence leaves a line of weakness which later results in a crack.

CAUSES . . (1) Low hydrostatic pressure. (2) Gating system. (3) Condition of sand. (4) Mold crush. (5) Sluggish metal due to impurities. (6) Cold metal. (7) Improper pouring practice.

REMEDIES . . (1) Increase height of cope so the metal in the sprue will be substantially above the highest level of the casting or castings in the mold. (2) Alter gating system to permit the free and smooth flow of metal into the mold cavities. (3) Check sand properties. High moisture has a tendency to chill the liquid metal. Low permeability and/or hard ramming will prevent the exit of the gases generated, thereby causing a back pressure and preventing any metal streams from completely joining. (4) A slight crush at the parting line may force a fin of sand into the metal, producing an appearance very similar to a cold shut. May be due to weights being too heavy, carelessness on the part of the molder, improper sand properties which allow the sand to sag when closing the mold. (5) Check furnace practice. Proper segregation of raw material would prevent the pick-up of any harmful impurities. Proper deoxidation and skimming practice should result in a more fluid metal. (6) Increase pouring temperature, keeping in mind that each alloy for a specific casting has a definite pouring range. (7) Check pouring technique. A fragment of oxidized metal from the lip of the pouring ladle sometimes will lodge in the wall of the casting, giving an appearance similar to a cold shut.

4. Crush. A casting exhibiting loss of shape or dimension due to the displacement of sand.

CAUSES . . (1) Core print too small. (2) Weights too heavy. (3) Carelessness on part of the molder.

REMEDIES . . (1) Check core prints. If the core print is too small for the core which is to fit into it, a core crush will result. (2) Use lighter weights. Weights used on molds must be heavy enough to prevent swells but not so heavy as to cause crushes. Careless setting of weights on the mold may also cause a crush. (3) Check molding procedure—uneven ramming or careless setting of cope on drag may cause a crush.

5. Swell. Casting showing deformation on cope due to displacement of sand by pressure of the sand.

CAUSES . . (1) Weights too light. (2) Improper ramming.

REMEDIES . . (1) Use heavier mold weights, but not so heavy as to cause a crush. (2) Too light a ram may cause a swell on the cope surface. Ram mold to desired hardness.

6. Variation in Wall Thickness. A casting which at one or more points shows more or less metal than called for by specification. It may be uniformly too heavy, uniformly too light, or may be too thick on one side of a cored cavity and too thin on the other.

CAUSES . . (1) Worn core boxes. (2) Core prints too large. (3) Uneven ramming.

REMEDIES . . (1) Check core-box dimensions. Worn core boxes cause the core to be too large, which results in castings with thin walls. (2) Check core print dimensions on patterns. If core prints on the pattern are too large, the core may shift or float, resulting in variation of metal thickness. (3) Check ramming of mold. Soft ramming may cause a swell giving heavier walls on the cope side.

7. Sand Wash. The casting may have rough lumps of metal at some points on its surface or may exhibit rounded corners which should be defined sharply. At other points, there will be roughly granular depressions or holes.

CAUSES . . (1) Core prints too small. (2) Too light ramming. (3) Improper sand conditions. (4) Improper cores. (5) Gating system.

REMEDIES . . (1) Check core print dimensions. Sand loosened by a crush, caused by core prints which are too small, may be washed into the casting as the metal flows over the crush. (2) Ram mold to greater hardness. When molds are rammed too lightly, the sand may wash when the metal enters the mold. (3) Check sand properties. If sand is not strong enough, due to insufficient bond, or is too dry the mold may be weak, tending to allow the sand to wash. (4) Too soft a core may wash. (5) Change gating system to prevent an excessive amount of hot metal from passing over a localized area. Gating should contain no sharp corners.

8. Scab. A rough spot, usually on a thin-walled portion of the casting, the wall being

slightly thicker than normal at that point, porous and containing sand grains.

CAUSES . . (1) Too heavy ramming. (2) High clay in sand.

REMEDIES . . (1) Reduce mold hardness by lighter ramming. When the mold is rammed too hard, the mold face is so dense that there is not room for the sand to expand when it is exposed to the heat of the molten metal. Hence, the mold face buckles and allows metal to penetrate behind a portion of the sand on the mold face. (2) Check clay in molding sand—too high a clay content does not permit sand to expand.

9. Sand Blow. The casting shows an unnaturally smooth depression at one or more points on its outer surface or just under the outer surface.

CAUSES . . (1) Insufficient venting. (2) Improper sand properties.

REMEDIES . . (1) Vent the mold more freely. (2) Check sand properties. Wet sand, or sand with too low a permeability, is likely to result in sand blows.

10. Core Blow. The casting shows a smooth depression, sometimes black, sometimes golden, on an inner surface where there is a cored cavity or, often, a gas pocket in some heavy portion of the casting above the level of the cored cavity.

CAUSES . . (1) Improper core. (2) Improper core wash and paste.

REMEDIES . . (1) Check core mixture and baking time. Insufficient baking and improper venting of core may cause blow. (2) The core should be dried after assembly and coating.

11. *Burning Into Sand. Certain outer parts of the casting have a rough appearance as if the metal had penetrated freely between the sand grains, some of which are completely surrounded and enclosed in the outer wall of the casting.

CAUSES . . (1) Improper sand. (2) Excessively fluid metal. (3) Too high a pouring temperature.

REMEDIES . . (1) Check sand properties. When the sand is too coarse, too dry, or has too high a permeability, the metal may tend to burn-in. (2) Check melting practice. Excessively fluid metal may result from the use of too much phosphorus, or from the presence of such impurities as aluminum and silicon. (3) Lower pouring temperature as too high a temperature may give excessively fluid metal.

12. *Burning Into Cores. Sometimes a rough, sandy inner surface, similar to the penetration of metal into green sand, but more commonly in the form of metal fins penetrating into the core and containing trapped grains of core sand.

CAUSES . . (1) Excessively fluid metal. (2) Wrong core mixture. (3) Improperly baked cores. (4) Core wash may be necessary.

REMEDIES . . (1) Check melting practice. Excessively fluid metal may result from the use of too much phosphorus or the presence of such impurities as aluminum and silicon. (2) Check core mixture. If the amount of binder used in the mixture is not properly proportioned, the cores may crack when in contact with the molten metal and permit the metal to penetrate the cracks, thus forming fins. (3) Check core baking practice. Cores that are baked too rapidly or are overbaked may be the cause of this condition. (4) High-lead alloys have a tendency to burn-in, thus a core wash is necessary.

13. Sand Sticking in Cored Cavities. Even when there is no apparent burning-in, castings having intricate cored passages or cavities of small dimensions and relatively inaccessible, sometimes show a tightly adherent coating of sand.

CAUSE . . Sand grains wedged tightly into place due to contraction of metal and resistance of the binder.

REMEDY . . Use a binder which has more resilience. The sticking of core sand in inaccessible cored passages may be prevented by the use of a rubberbase or similar core wash.

14. Surface Imperfections. Castings of otherwise apparently perfect quality sometimes have surface defects which may be of importance on the ground of appearance only. In other cases, these apparently superficial defects are indicative of more deep-seated ailments. The following are typical (b and c are **not** applicable to the copper-silicon alloys):

a) WORMY SURFACE . . The surface of the casting, usually in the vicinity of the gate, shows irregular depressions, shallow but elongated, similar in appearance to worm tracks. These depressions are often filled with a deposit of zinc oxide, and are sometimes accompanied by a very poor fracture. (In copper-silicon alloy castings, the depressions mentioned are not filled with the zinc oxide deposit. However, the presence of 0.5 per cent lead in these alloys is likely to produce a chalk-like surface on the castings after they have been removed from the sand. More than 0.5 per cent lead is likely to produce a wormy surface.

CAUSES . . (1) Inadequate gating. (2) Presence of impurities.

REMEDIES . . (1) Use larger gate or more gates. (In copper-silicon alloys, wormy surface is more likely due to the presence of lead.) (2) *Check materials used in charge and melting practice. In leaded alloys, very small percentages of silicon or aluminum are likely to produce a wormy surface. Excessive phosphorus in the leaded semi-red brasses may cause this condition.

b) *SURFACE STAINS . . The surface of the casting shows a black discoloration of varying size and shape.

CAUSES . . Use of excessive flour or molasses on mold surface.

REMEDY . . More care in the use of these materials.

c) *TIN OR LEAD SWEAT . . The surface of the casting is more or less covered by a thin layer of white metal. In the case of lead, the sweat often occurs in spots or in lumps, sometimes of considerable thickness.

CAUSES . . (1) Presence of impurities. (2) Proportion of tin too low. (3) Presence of excessive amounts of gas in the metal. (4) Improper sand conditions.

REMEDIES . . (1) Check materials and melting practice. Silicon and aluminum may have been present in the scrap used in the furnace charge. Silicon may also be picked up from silicon carbide in the furnace lining or, in an electric arc furnace, may be produced by the action of incandescent carbon particles on the siliceous lining. (2) Increase tin percentage to proper proportion in desired alloy. Lead sweat is most likely to result from too low a proportion of tin in the alloy. With lead as high as 10 per cent, zinc also should be maintained at 6 per cent or above. (3) Check furnace practice. It is possible that the presence of an excessive amount of gas such as hydrogen dissolved in the molten metal may force the lead or tin to the surface of the casting. (4) Increase permeability of sand mixture and vent freely. Gas that may be picked up by the metal in the mold may cause the lead or tin to be forced out to the surface of the casting.

d) ROUGH OR PITTED SURFACE . . Although the casting does show evidence of sand washing or scabbing, the surface is rough or exhibits an occasional angular pit, sometimes so deep as to leave an objectionable scar on a finish-machined surface.

CAUSES . . (1) Coarse sand. (2) Dirty sand. (3) Use of too fluid fluxes. (4) Poor pouring practice.

REMEDIES . . (1) Use finer sand. (2) Recondition sand to eliminate any fragments of cores or metal. (3) Check melting practice. Very fluid fluxes cannot be skimmed readily from the surface of the metal and are likely to be carried into the mold, resulting in surface imperfections in the casting. (4) Check pouring practice. Faulty skimming or careless pouring may result in fragments of slag or oxidized metal entering the mold and lodging on the surface of the casting.

15. Solid Inclusion. With a fracture which otherwise appears to be good, the walls of

*Not applicable to copper-silicon alloys.

Copper-Base Casting Defects

the casting contain particles or small chunks of nonmetallic substance, or separate pieces of metal not coalesced with the body of the casting.

CAUSES . . (1) Poor melting practice. (2) Poor pouring practice.

REMEDIES . . (1) Check fluxing materials and furnace charges. Solid inclusions in the walls of a casting, apparent in the fracture, may be due to "soupy" fluxes and slags. Iron introduced into the charge may also appear in the casting as a solid inclusion. (2) Check the pouring practice. Faulty skimming or careless pouring may be the cause of solid inclusions in the body of the casting.

16. Shrinkage Cracks and Cavities. With a fracture otherwise apparently good, the casting shows at one or more points a crack or cavity where the metal has pulled apart while it was still in a plastic condition. The walls of the shrinkage cavity are usually tarnished to a color which varies from orange to dark brown.

CAUSES . . (1) Improper gating. (2) Lack of proper risers. (3) Too low a pouring temperature. (4) Improper casting design. (5) Careless removal of casting from mold while still hot short.

REMEDIES . . (1) Study the casting and revise if necessary. (2) Study solidification of the casting and place risers at necessary points. (3) Increase pouring temperature. If other conditions are correct, shrinkage cracks and cavities may be due to too low pouring temperature. (4) Design of the casting should be such that when molten metal is poured into the mold cavity in the correct manner it will solidify progressively from the bottom of the mold to the top toward the risers. If possible, avoid joining of light and heavy sections. When unavoidable, blend light into heavy sections. Use ample fillets in corners, striving at the same time to maintain equal section thicknesses. (5) Exercise more care when removing castings from sand and allow to cool longer in the mold before removal.

17. Weak, Discontinuous or Open Structure. The fracture of the casting is bad at practically all points. Commonly the structure is dendritic with minute fissures between the crystals, which are tarnished to an orange or brown color. Sometimes, with crystals of more normal size, the fracture is of a loosely granular appearance rather than fibrous. Other varieties of abnormal fracture may be encountered.

CAUSES . . (1) Presence of aluminum or silicon in the alloy. (Obviously the presence of silicon in the copper-silicon alloys is not detrimental.) (2) Too high a pouring temperature. (3) Presence of detrimental gases.

REMEDIES . . (1) Check melting materials and practice. Silicon may be present in the scrap or may be reduced from the furnace lining. Aluminum may be present in the scrap. Presence of either or both silicon and aluminum causes a coarse, dendritic, discolored fracture. (2) Use lower pouring temperature. Too high a pouring temperature causes a coarse, open crystalline structure. (3) A major cause of weak, discontinuous or open structure is the presence of small amounts of deleterious gases, i.e., hydrogen.

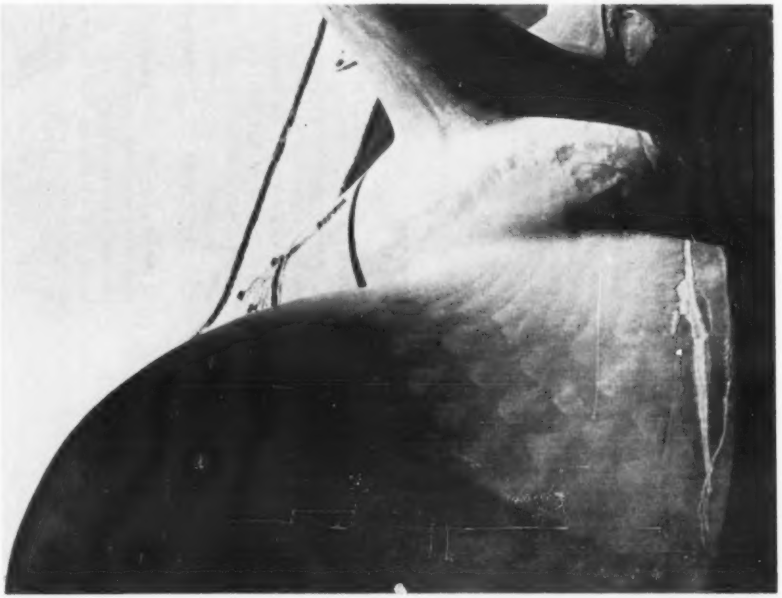
18. Gas Porosity. This condition is marked by small but clearly discernible gas bubbles, usually segregated near the surface but underneath the skin of heavy sections of the casting. The cavities are approximately round and bright and free from tarnish.

CAUSES . . (1) Presence of detrimental gases in the molten metal. (2) Heating and pouring at too high a temperature. (3) Improper casting design. (4) Carbonaceous matter in the molding sand.

REMEDIES . . (1) Check melting practice. The presence of hydrogen and oxygen together in the metal, absorbed from the furnace atmosphere, causes gas porosity. If the furnace is operating under reducing conditions, that is, the presence of unburnt fuel in the products of combustion, the molten metal has a strong tendency to pick up hydrogen from this source. Another source of hydrogen can be traced to water or oil in the furnace charge. (2) Remove metal from furnace only a few degrees above the proper pouring temperature. The amount of gas that may be dissolved in the metal is directly proportional to the temperature. (3) Use proper fillets in casting design. When castings are designed without proper fillets, there will be a tendency to pour at such high temperatures that gas porosity results in heavy sections. (4) Use sand free from carbonaceous matter.

19. Cleaning Defects. All cleaning defects are caused by careless handling of the cleaning equipment, fracturing gates or risers into the casting itself, or from insufficient knowledge of the size and shape of the casting.

Buffing Swirl Marks Still Show on Blade



After one year of continuous service, the buffing swirl marks still remain on the five blade propeller of the S. S. American Clipper. A development of Baldwin-Lima-Hamilton Corp., Philadelphia, the material is an alloy of copper, nickel, aluminum and other elements. It is noted for its exceptionally high resistance to cavitation and erosion as well as its light weight and high tensile strength.

Skyline photo shows portion of Houston business section that will become familiar sight to foundrymen during the 1955 AFS Convention.

AFS Convention . . .

Technical Program Developing Rapidly

As THE END of the year approaches, division and general interest committees are completing their technical programs for the 1955 AFS Convention to be held in Houston, May 23-27.

The program outlined in the November issue (page 67) remains essentially unchanged as to technical sessions. However, the following special events have been rescheduled and are now planned for:

SUNDAY, MAY 22

5:30-7:00 pm . . President's Reception

TUESDAY, MAY 24

6:30 pm . . AFS Alumni Dinner

WEDNESDAY, MAY 25

8:00 am . . Past Presidents' Breakfast

Convention features which remain unchanged are:

WEDNESDAY, MAY 25

9:30 am . . Annual Business Meeting
10:30 am . . Charles Edgar Hoyt Annual Lecture
7:00 pm . . Annual Banquet

THURSDAY, MAY 26

7:00 pm . . Texas Chapter Night

Technical highlight of the week, the Charles Edgar Hoyt Annual Lecture, will be delivered the morning of Wednesday, May 25, by F. J. Walls, International Nickel Co., Detroit. The Hoyt Lecture will follow the Annual Business Meeting, at which President F. J. Dost, Sterling Foundry Co., Wellington, Ohio, will deliver his presidential address and present cash awards and certificates to top winners in the AFS Apprentice Contest.

The 1955 Apprentice Contest remains open until a date in March which will be announced later. Apprentices interested in competing for the cash prizes and trips to the Convention are urged to contact promptly Ashley B. Sinnett, AFS education director. Competition is open in each of the five divisions—gray iron, steel, and non-ferrous molding, metal patternmaking, wood patternmaking—for prizes of $100, $50, and $25, and certificates commemorating the award. In addition, the first place winner in each division receives round trip fare and Pullman space so he can attend the Convention.

The competition is open to learners, trainees, and students, as well as apprentices. Revised eligibility regulations specify that the term *apprentice* shall for purposes of the contest be understood to mean a learner or trainee in the all-around practices of the trade, who has not had over five years' experience in patternmaking nor more than four years in foundry work. All learners and trainees entering the contest must be registered on company payrolls as a learner or trainee.

A Symposium on Non-Destructive Testing sponsored in cooperation with the Society for Non-Destructive Testing is planned for the afternoon of Friday, May 27. Scheduled are discussions on *"The Value of Experimental Stress Analysis in the Development of Better Castings"* and *"Non-Destructive Testing for the Castings Industry"* as well as papers dealing with magnetic particle inspection and radiography by x-ray and gamma ray.

Highlight of the Gray Iron Div. program announced by C. K. Donoho, American Cast Iron Pipe Co., Birmingham, Ala., gray iron program chairman, will be a Symposium on Quality Improvement of Molten Iron featuring papers on techniques for nitrogen injection of powdered desulphurizers, alloys and inoculants. Carburization, desulphurization, and up-grading of physical properties will be covered fully.

Latest developments in the field of nodular iron, gases in gray iron, and fluidity, along with gray iron melting and metallurgy will be treated in other papers on schedule.

The Industrial Engineering Committee headed by J. J. Farkas, Cincinnati Milling Machine Co., Cincinnati, plans on two sessions, one starting at 9:30 am, Tuesday, May 24, and a luncheon at noon the following day. At the Tuesday morning session, Prof. M. E. Mundel, Marquette University, will discuss office procedures, illustrating how to organize office routine to minimize paper work while still giving management all the records necessary for good statistical control of a business.

Following Prof. Mundel, S. D. Martin, Central Foundry Div., General Motors Corp., Saginaw, Mich., will cover *"Production Standards and Their Place in the Foundry Industry."* His presentation will show how statistical control measures affecting production planning, scheduling, costing, and the like, can be derived from basic production standards.

Subject of the next day's luncheon speaker, M. E. Annich, American Brake Shoe Co., Mahwah, N. J., is *"Hidden Fixed Costs and Their Effects on Profit and Loss."* He is expected to give a new approach and analysis to an old subject.

A Forum on Application of Heat Transfer Principles to the solution of practical foundry problems is scheduled by the Heat Transfer Committee, according to Committee Chairman W. S. Pellini, Naval Research Laboratory, Washington, D. C. Emphasis in the six papers already approved for presentation is on the use of information developed during nine years of research in basic principles. Extensive discussion of the open forum type, with ample opportunity for questions and answers will occur between the short, to-the-point papers.

Rounding out the more formal technical meetings with prepared papers, are the informal shop courses, and luncheon, and dinner sessions. The off-the-cuff exchange of information accompanying the discussions at these meetings is expected to appeal again this year, as in the past, to foundrymen and patternmakers interested in solving shop problems.

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Officers and part of N.F.A. administrative council during annual meeting. Standing, left to right, are: Paul L. Arnold, U. S. Pipe & Foundry Co., Chattanooga, Tenn., vice-president; W. W. C. Ball, Taylor & Fenn Co., Windsor, Conn., president; and Summerfield Brunk, Headford Brothers & Hitchins Foundry Co., Waterloo, Iowa, immediate past president. Seated, left to right, are: Lewis N. Essex, Golden Foundry Co., Columbus, Ind.; Ashley B. Nolan, U. S. Pipe & Foundry Co., Bessemer, Ala.; J. S. Bridges, U. S. Pipe; Albert J. Graf, C. B. Cottrell & Sons Co., Westerley, R. I.; Arthur G. Hall, Nordberg Mfg. Co., Milwaukee; A. V. Martens, Pekin Foundry & Mfg. Co., Pekin, Ill.; Herman Menck, Harnischfeger Corp., Milwaukee; H. H. Harris, General Alloys, Inc., Boston; S. J. Moran, Union Steel Castings Div., Blaw-Knox Co., Pittsburgh, Pa.; and Erich C. Wussow, Kaukauna Machine Corp., Kaukauna, Wis.

NFA Studies Management Problems

H. F. SCOBIE / *Editor*

MEMBERS of the National Foundry Association met October 7 and 8 at the LaSalle Hotel, Chicago, for their 56th annual meeting under the chairmanship of Summerfield Brunk, Headford Brothers & Hitchins Foundry Co., Waterloo, Iowa, N.F.A. president.

In addition to considering management problems relating to tax matters, human relations, industrial activity, financial practices, and personnel problems, the association elected the following officers: president, W. W. C. Ball, Taylor and Fenn Co., Windsor, Conn.; vice-president, Paul L. Arnold, U. S. Pipe & Foundry Co.. Chattanooga, Tenn.; and treasurer, Frank J. Sherwin, Chicago Hardware Foundry Co., North Chicago, Ill. Charles T. Sheehan was reappointed executive secretary. The two-day meeting was preceded by administrative council sessions and committee meetings on October 6.

Mr. Brunk opened the meeting on October 7 with a review of N.F.A. services, referring to the organization as "the association of foundry management." He introduced J. P. Goedert, chairman of the committee on Long Range Planning, American Institute of Accountants, who spoke on *"A Working Analysis of the 1954 Tax Bill."* The 1954 Internal Revenue Code is a complete revision containing some 300 new concepts of taxation, Mr. Goedert stated.

Major changes in the new tax regulations which affect business, discussed by Mr. Goedert included: liberalized depreciation provisions; tax estimates and advance payments by corporations; modified rules with respect to unreasonable accumulation of earnings; liberalization of loss carry-backs; modernization of tax accounting; deductibility of estimated expenses; deductibility of research and experimental expenditures; employees' benefit and compensation plans; taxable years; and acquisition of loss corporations.

Second speaker was John Perry, Straus & Perry, Washington, D. C.; his subject, *"A Practical Program of Human Relations for Foundries."* Human relations does not mean company picnics, clean washrooms, company magazines, suggestion boxes, etc., he said, pointing out that these are useful but are icing on the cake. Human relations refers, he explained, to behavior of people in relations with each other, essentially their behavior in groups. Most human activity is group activity and in a plant of 200 it was possible to find some 50 overlapping groups with many varied interests, he declared. Many of the groups would have conflicting interests. Over all is one big group—the company group—which includes everyone in the plant. The test of relationships in the plant is how well this group works, how strong it is, how much attraction it has for every one of its members, to what extent they feel a common purpose, and to what extent they succeed in attaining those goals.

Mr. Perry gave as the essence of a practical human relations program:

1. Share information with employees, from top to bottom. Listen to questions and give straight answers. If answers don't come from management, employees will think up their own, which may be far more damaging to human relations than anything told to them.

2. Let employees share information

Some of N.F.A. administrative council members and the officers are, standing left to right: Summerfield Brunk, immediate past president; W. W. C. Ball, president; and Paul L. Arnold, vice-president. Seated, left to right, are: Frank J. Sherwin, Chicago Hardware Foundry Co., North Chicago, Ill., treasurer; R. I. Wells, Chicago Foundry Co., Chicago; R. D. Zangrilli, Standard Electric Steel Castings Co., Springfield, Mo.; Ray F. Heiden, Galva Foundry Co., Galva, Ill.; Charles L. Kronner, Mueller Brass Co., Port Huron, Mich.; A. Leslie Dyer, Buckeye Foundry Co., Cincinnati; R. R. Washburn, Plainville Casting Co., Plainville, Conn.; R. C. S. Potter, Chemung Foundry Corp., Elmira, N. Y.; and John F. Livingston, Crouse-Hinds Co., Syracuse, N. Y.

with management. Give them a way to share that assures them that management is listening, wants to listen, and understands.

In discussing disputes and settlement of conflicts, Perry warned against settlement by domination, which he said merely postpones real settlement with the losers waiting for another chance to get their way. Compromise, he said, results in each side accepting partial defeat, and each feels something has been lost. He called integration the proper solution with both sides seeking the constructive answer—what's best for the company.

Luncheon speaker was Leo Wolman of the National Bureau of Economic Research. One of the characteristics of our economic system, he said, is its need to adjust itself from time. Three adjustments have occurred since the war, the latest having started in the fall of 1953. Some of the adjustments are brought on by mistakes which are inevitable in a big economic system of some 165 million people, the speaker said. A frequent business mistake is misinterpretation of the future in which anticipated continual high activity isn't sustained. Result is slow down in production while goods are sold out of stock.

Another influence on the economic situation is the consumer who, collectively, possesses a bigger stock of capital goods than all industry does. If the consumer saves several per cent more of the national personal income of $285 billion the effect on total volume of business is immediate, Dr. Wolman said. The country has gone back to a competitive condition, he reminded his listeners in discussing current trends. You have to get out a good product, one the customer prefers, else you are through, he stated.

I don't see any dire future, Wolman said in closing. The situation isn't bad and it's getting better.

"Cleaning Up Your Financial House" was the subject of Francis J. Calkins, Finance Dept., Marquette University. Financial planning is necessary to achieve the following three objectives, he stated: adequate cash to meet bills as they come due; pay for additions and replacements as needed; and maintain an "open-door" policy toward getting more cash when it is needed.

Maintenance of adequate cash for inventory and receivables requires careful planning, especially in the foundry industry which is one of the most acutely sensitive to business changes. Ideal policy is to enlarge stocks, particularly for raw materials, at the start of a business rise. Then work them off gradually until a hand-to-mouth buying policy becomes necessary at the peak of a cycle. Only trouble is, Dr. Calkins said, the cycles are uneven in both length and amount of rise and fall. What to do? Maintain a fat checkbook, or follow the financial maxim: "Mistrust your optimism, and try to avoid being caught in crowds."

Sales do not bring cash automatically, Calkins said, in pointing out that the amount of cash tied up in customers' hands depends on the amount of sales and the terms of sale. One way to handle receivables is to have weekly, at least monthly, reports of the number and dollar amounts of orders discounted, paid before due, paid when due, and overdue by 10, 30, and 60 days. Enlarging cash discounts generally is not too helpful, he said, since those who can't take the discounts anyway will not be affected.

The new tax law also affects working capital needs, Calkins warned. With accelerated tax payments, by 1960 it will be possible to do business on Uncle Sam's money for no more than six months.

Following a discussion of fixed asset expansion and replacement, Calkins listed three maxims to follow in solving the problem: where does the cash come from? These are: 1. Owner money is always better than debt money. 2. Never borrow short term money to finance long-term needs. 3. Never close the door on opportunities to get additional cash if it be needed. To clean up a firm's financial house at the present time, the speaker said he would: try to get as much long-term money as might be reasonably needed over the next four or five years, keeping in mind the cost of getting it; learn about all the sources of short-term emergency cash; and plan for the future confidently with an eye on the collections record and on the most valuable of all assets—cash.

"Time Study and Incentive Clauses in Union Contracts" was covered by Phil Carroll, consultant, Maplewood, N. J., in the next session. He discussed the use of standard data and urged their use as giving more consistent standards.

The entire morning of the second day was given over to a panel discussion entitled, *"Collective Bargaining Problems, Programs, and Policies."* Moderator was Russell Moberly, Management Center, Marquette University. Representing various types of employers were: medium foundry—R. R. Washburn, Plainville Casting Co., Plainville, Conn.; small foundry—Robert Langenkamp, Langenkamp-Wheeler Brass Works, Inc., Indianapolis, Ind.; large foundry—Charles R. Appel, U. S. Pipe & Foundry Co., Chattanooga, Tenn.; and group of foundries—R. J. Redmond, Buckey Foundry Co., Cincinnati, president, Miami Valley Foundrymen's Association.

Luncheon speaker was George W. Cannon. In his talk, *"What the Future Holds for the Foundry Industry,"* he reviewed advances of recent years and compared the progress made with the industry as it was at the turn of the century. He predicted even greater progress for the future as the foundry industry keeps pace with demands.

Walton Woody, AFS Past President, Dies

Walton L. Woody, 63, vice-president in charge of operations, National Malleable & Steel Castings Co., Cleveland, and past president (1950-51) of AFS, died suddenly of a cerebral hemorrhage October 30 in Lakeside Hospital, Cleveland.

Mr. Woody initiated the program culminating in construction of the new AFS headquarters building which he never saw. He had been expected to play a prominent role in the dedication of the building in Des Plaines, Ill., November 18. He instigated the program, under which AFS obtained its permanent headquarters building, while serving as president-elect at the AFS Convention in Cleveland in 1950, and sparked the fund drive during which $225,000 was contributed by the foundry industry for the project.

Walton L. Woody . . . 1891-1954

Long active in AFS affairs, Mr. Woody was first chairman of the Northeastern Ohio Chapter and had been associated with the Society's Malleable Div. He served on the national board of directors in 1942-45 and was elected vice-president in 1949.

Born in Terre Haute, Ind., Mr. Woody started his foundry career in graduating from Rose Polytechnic Institute with a degree in chemical engineering in 1914. With National Malleable his entire industrial life, he worked as a chemist in the company's plants in Indianapolis and Toledo before going to Cleveland where he established the chemical laboratory. Later he became metallurgist, assistant superintendent and, in 1925, works manager. He was later manager of the Chicago plant, then returned to Cleveland, and in 1938 became manager of the Sharon, Pa., plant. During the next five years he directed extensive expansion and mechanization of the Sharon and Chicago operations. In 1942, he became assistant to the president, and vice-president in charge of operations a year later.

Mr. Woody was a director of National's subsidiary, the Capitol Foundry Corp. of Phoenix, Ariz., and a director of the First National Bank of Sharon.

He was a member of many state and national manufacturing groups, the University Club of Cleveland, the Union League of Chicago, and the Indianapolis Athletic Club.

He is survived by his wife, Nell, who resides at the family home, 19100 Shaker Blvd., Shaker Heights, Ohio; three sons, Walton L. Jr., Richard, and Robert; three sisters, two brothers, and five grandchildren.

W. B. Wallis

David E. Davidson

C. R. Heller

FEMA Examines Business Trends

H. F. Scobie / *Editor*

THE 36TH annual meeting of the Foundry Equipment Manufacturers Association was held at the Greenbrier, White Sulphur Springs, W. Va., October 14-16. More than 100 representatives of foundry equipment producers attended.

In addition to holding product group meetings, discussing business statistics, and holding other business sessions, officers were elected for the coming year. They are: president, W. B. Wallis, Pittsburgh Lectromelt Furnace Corp., Pittsburgh, Pa., and vice-president, David E. Davidson, Link-Belt Co., Chicago, both re-elected, and executive secretary-treasurer, C. R. Heller, Washington, D. C.

Einar A. Borch, National Metal Abrasive Co., Cleveland, was elected to the board of directors. Together with Messrs. Wallis, Davidson, and Borch, the following also serve as FEMA directors: P. F. Bauer, Norwood Works, Allis-Chalmers Mfg. Co., Norwood, Ohio; W. G. Frank, American Air Filter Co., Inc., Louisville, Ky.; R. J. Hines, Hines Flask Co., Cleveland; O. H. McCleary, Mathews Conveyor Co., Ellwood City, Pa.; Claude B. Schneible, Claude B. Schneible Co., Detroit; and G. E. Seavoy, Whiting Corp., Harvey, Ill.

General meetings opened the second day with President Wallis presiding. Executive Secretary Heller reviewed *"The Washington Scene."*

C. V. Nass, Beardsley & Piper Div., Pettibone-Mulliken Corp., Chicago, commented on a recent five-week trip to Europe where he visited over 40 foundries in addition to representing AFS at the International Foundry Congress in Florence, Italy. Outside of the sterling areas, which Great Britain will sell to, he said, American manufacturers of foundry equipment can expect competition from German manufacturers.

Following the treasurer's report by Mr. Heller, Mr. Borch, chairman of the Statistical Committee, presented an interpretation of FEMA statistical data. Shipments are up over 1947-49, he said, although unfilled orders are down. Rate of activity is headed up in the last quarter, he explained. Purchases are motivated, he declared, by short range expansion, replacement, modernization, and long range expansion. Long range capital investment spending is based on four or five-year projections, not on current business conditions, he stated in pointing out that the larger companies will modernize and expand regardless of current conditions.

National Casting Council activities were reported by Frank G. Steinebach, Penton Publishing Co., Cleveland, NCC secretary. Major problem of the industry is representation in Washington, he said.

Reporting on the Foundry Educational Foundation, F.E.F. President Thomas Kaveny, Jr., Herman Pneumatic Machine Co., Pittsburgh, Pa., president of F.E.F., outlined the meaning of the Foundation to F.E.M.A.

First, he said, the Foundation has provided engineering students an opportunity to work with and understand modern foundry equipment.

Second, Mr. Kaveny declared, the Foundation provides foundries with technical manpower who, as engineers, understand and appreciate the intelligent application of mechanization. Third, F.E.F. has generated a completely new attitude among students, educators, and other industries. Result, he said, is an increase in the number of foundry courses taught and in the number of engineers teaching foundry practice.

Finally, Kaveny pointed out, the pool of technical talent created by the Foundation provides the foundry equipment industry with a source of engineers having special training in foundry practice.

The first day closed with a reception honoring President and Mrs. Wallis, and the annual banquet with Leon F. Miller, Osborn Mfg. Co., Cleveland, chairman of the Annual Meeting Committee, as master of ceremonies.

Vice-President Davidson presided over the final day's sessions. Mr. Borch presented a study of rate of activity in the foundry equipment industry. Principal speaker of the annual meeting, James H. Smith, Central Foundry Div., General Motors Corp., Saginaw, Mich., spoke on *"The Future of Castings in the Automobile Industry."* In expressing confidence in the future of castings in the automotive field, he first pointed to obvious confidence in the future of the automobile as indicated by extensive expansion programs in the field. He cited as an example, the more than $21 million worth of new foundry facilities Central Foundry Div. will have instituted by the middle of 1955.

Time and again, Mr. Smith stated, it has been demonstrated that his division's customers will favor castings over forgings, stampings, and steel weldments, provided they can be produced to meet service and mechanical specifications at a competitive price. Traditionally, the foundryman has been adept in finding ways to the difficult job today, the impossible one tomorrow, he declared. This philosophy will insure a bright future in the use of castings in the automobile industry, he concluded.

A. A. Hilbron, AFS exhibit manager, commented briefly on the success of the 1954 AFS Convention and Show and reminded his listeners that the 1955 AFS Convention, a non-exhibit meeting, would be held in Houston, May 23-27. In 1956 the AFS Show would again be held, he said, with location Atlantic City, and date May 3 through 9.

Michigan Regional Features Gating, Risering, Molding

VERN CARLSON / *Technical Writer*

Bruce L. Simpson, national vice-president of AFS, addressing banquet crowd at Michigan Regional Foundry Conference.

FOUNDRYMEN attending the Michigan Regional Foundry Conference at Ann Arbor contemplated expansion of the casting market, improvement of casting quality, and reduction in casting cost through engineering. The two-day meeting featured sessions on risering, gating, mold production, and research.

The conference, held on the University of Michigan campus October 14 and 15, was sponsored by the Detroit, Saginaw Valley, Central Michigan, Western Michigan Chapters, and the Michigan State and University of Michigan Student Chapters of AFS.

Kenneth H. Priestley, Vassar Electroloy Products, Inc., Vassar, Mich., was general conference chairman. Honorary chairman was Dean George G. Brown of the University of Michigan. Program chairman was Woodrow W. Holden, Foundry Div., Eaton Mfg. Co., Vassar, Mich.

Prof. Richard A. Flinn, University of Michigan, opened the conference by introducing Dean Brown who commented on the tremendous progress of the foundry industry in recent years in welcoming conference attendants. He was followed by William G. Gude, *Foundry*, who spoke on *"Casting Horizons."* He predicted prosperity for the industry on the basis of the vast amount of money that has gone into casting industry development, the increasing annual tonnage of castings, increasing population, and redistribution of income.

An engineering approach to design and production will enable castings to compete with other processes in providing the quality and tolerances which are of increasing demand. The speaker proposed automation and refinement of the various molding processes to insure the position of castings.

Prof. C. C. Sigerfoos, Michigan State College, was chairman of a risering session; co-chairman was Henry Laforet, Lakey Foundry Co., Muskegon, Mich. Spokesman for steel was John B. Caine, Cincinnati consultant; gray iron was covered by Harry Kessler, Sorbo-Mat Process Engineers, St. Louis.

Mr. Caine directed his remarks on *"Risering for Magnaflux Inspection"* to all who work with metals prone to hot tear. He stated that this inspection disclosed crack-like defects which are usually invisible on the surface and which may or may not show after machining. He emphasized that although a discontinuous rupture may be only 0.001 in. wide, it may be as much as 3 in. long and an inch deep. He pointed out that factors favoring adequate feeding aggravate hot tearing tendencies.

A "cook book" method of calculating risers was described by Mr. Kessler. He showed the relationship between classes of iron, per cent shrinkage, and riser efficiency. He recommended a riser diameter of 1½ times the maximum casting section, with a height twice the diameter. The area of the throat should be half the riser area up to 4 sq. in. and equal for areas over that.

"The Future of Castings in the Automobile Industry" was predicted at the luncheon by James H. Smith, Central Foundry Div., General Motors Corp., Saginaw, Mich. After reviewing reasons for a strong economic outlook for the auto industry, he urged foundrymen to improve methods for producing quality castings at lower costs to retain the customer confidence so necessary for the growth of the casting industry.

With 53 per cent of all malleable and 25 per cent all gray iron going to the automobile industry, its relationship to the casting industry is apparent. Mr. Smith said a trend toward closer relations of automotive engineers with foundrymen promised a greater use of castings. The competitive advantages of recent technological advances have added to the number and amount of castings without taking business away from existing casting methods, he declared.

Co-chairmen of the session on gating were Donald F. Rundle, Engineering & Research Div., Chrysler Corp., Detroit, and Noel West, Buick Motor Div., General Motors Corp., Flint, Mich. Carl B. Stone, Lynchburg Foundry Co., Lynchburg, Va., speaking on the gating of gray and ductile iron, recommended the comprehensive study of low-loss castings to obtain the factors that make for good gating systems.

He said every casting has a proper pouring time with which consistent results can be obtained with defects at a minimum. He proposed calculating the pouring time by multiplying the square root of the casting weight by the pouring factor for the casting section. The following factors were given for sections stated: 1.4 for less than ⅜ in., 1.8 for ⅜ to ¾ in., 2.2 for 1 to 1½ in., and 3.0 for 2 to 3 in. sections. He said that choking at the bottom of the sprue is very common but recommended as more foolproof, putting the choke in the runner where it is a part of the pattern.

The elaborate gating systems of magnesium practice, explained H. E. Elliott, Dow Chemical Co., Bay City, Mich., are required because of the high drossing tendency of the molten metal and its low heat content which limits the distance it can be run.

He attributed oxide inclusions to the drossed metal surfaces in turbulent areas being mixed into the flowing metal. The "froth" of gasses in the metal can be largely separated mechanically in the gating system before running the metal into the cavity. Although precautions should be taken to prevent turbulence, Mr. Elliott suggested the more economical practice of tolerating early turbulence with separation before filling the cavity.

He declared it is imperative to run the sprue to the lowest level in the mold from which metal may flow horizontally or upward. A screen in the sprue serves as a choke as well as to separate the dross from the metal.

The short solidification characteristics of magnesium do not allow time to establish temperature gradients for sound solidification conditions, he said. He recommended that risers be filled directly from the gating system as metal passing through the casting to the risers would be cold.

Elliott warned of the danger of filling bosses on horizontal thin walls. He explained that risers at this level competing with the thin wall for metal to fill the mold may cause the bosses to be defective. A top riser or tilted mold would be helpful; pouring hotter and

K. H. Priestley, Michigan Conference Chairman, at microphone. Seated are, left to right: W. W. Holden, program chairman; John A. Van Haver, vice-chairman and publicity chairman; F. J. Walls, speaker; Harry Kessler, toastmaster; and Dean George G. Brown.

faster would help prevent misruns, but would increase drossing.

Harry Hillstrom, Aluminum Co. of America, Cleveland, attributed the long slushy state of aluminum solidification to the high thermal conductivity and high latent heat and specific heat relative to its solidus temperature. Knowledge of the alloy analysis is necessary to designing gating systems, he said, but recommended that chilling and risering be determined before considering the gating system. Mr. Hillstrom related many of the gating procedures of Elliott to aluminum practice.

Malleable gating practice was presented by Lawrence Winings, Wagner Malleable Iron Co., Decatur, Ill. He recommended a thorough knowledge of solidification shrinkage of malleable iron as a prerequisite to designing castings.

He stated that casting design is one of the most important factors in good gating because it is often impossible to feed an improperly designed casting. Most common alteration, he said, is addition of metal at the right place to facilitate feeding. In some instances the change may be in the form of a fillet or gating lug, or added finish on a finished surface.

Can Be Lightened

In some cases, he said a heavy section that causes a gating problem can be lightened without harming the utility of the casting. Another practice is to add metal at one place while lightening at another to get a more uniform metal section with more uniform cooling.

At the conference banquet, AFS Vice-President Bruce L. Simpson, National Engineering Co., Chicago, spoke briefly on *"Prestige and Job Insurance."* He told how a foundryman can advance himself through AFS membership and such activities as chapter meetings, regional conferences, participation in local and national committee work.

Principal banquet speaker was Fred J. Walls, Detroit Technical Group, International Nickel Co., who spoke on *"Economy in the Foundry Through Education and Engineering."* He quoted from an 1854 address by Louis Pasteur who was elated with the decision to let students use faculty laboratories to practice the theory presented in lectures. Pasteur considered the lecture-laboratory combination to be the best way of interesting a young man or turning an indifferent student into a hard worker. Pasteur warned against disdaining that which has no immediate application.

Mr. Walls urged his listeners to participate in the development of the hidden talents of individuals.

To avoid the misconception that many people have of the industry, he likes to think of modern foundries as casting plants or casting shops, Walls said. He pictured a casting plant as a materials handling shop interspersed with many technical processes where skill and science are combined and where engineering becomes an extremely important factor.

Engineer Must Be Versatile

The engineer, especially of the small plant, must be a versatile person with knowledge of handling liquids, solids, and gasses—often at elevated temperatures. Mr. Walls warned that even though specialists may be found among the suppliers and equipment manufacturers, coordination of their help is required to produce better castings at lower cost.

He appealed to industry to provide opportunity for the engineer to "transform his knowledge into dynamic thinking."

Walls explained that research today was necessary to meet the economics of tomorrow. The research of the plant need not be highly scientific, but it should in some way be an effort—through application of recent discoveries or the use of cut and try methods—to improve the processes involved in the casting operation. He closed by again quoting Pasteur, "Chance favors only those minds which are prepared."

Toastmaster was Harry Kessler.

Friday morning's session on mold production had as chairman Harold N. Bogart, Manufacturing Research Dept., Ford Motor Co., Detroit.

John A. Van Haver, Sealed Power Corp., Muskegon, Mich., spoke of his experiences in adapting green sand pressure molding to foundry operations at his plant. In a glimpse at the future of green sand molding he foresaw quiet operation of diaphragm molding machines, high production shops with fewer and more highly skilled men, less expensive installations, close competitive casting tolerances.

Harold G. Sieggreen, Saginaw Malleable Foundry, General Motors Corp., Saginaw, Mich., said the shell molding process is being used in three plants of GMC's Central Foundry Div. The malleable foundry is pouring gray iron, alloy iron, malleable, and pearlitic malleable into production shell molds, he said. He illustrated the horizontally poured, unbacked molds and other features with a short movie of their operation.

Sieggreen warned that accuracy was affected by pouring and gating techniques; that fast or high pouring resulted in bulged castings. He indicated that a 4-in. draw with 12 minutes draft was used on an experimental job, and told of using zircon sand ram-up cores in an intricate job. Shell cores used by Central Foundry Div. are made of pre-coated sands. He saw no limiting factor to shell molding other than volume production.

Discussed Permanent Molds

H. U. McClelland, Foundry Div., Eaton Mfg. Co., Vassar, Mich., spoke on the place of permanent molds in the casting industry by recounting the development of his company's operation. He stated that permanent mold castings enjoy a competitive advantage for those castings suitable to this process.

For lunch the second day, members of the University of Michigan Student Chapter prepared steak sandwiches for conference attendants in the university foundry. Buns were toasted in the radiant-heated shell curing oven and steaks were broiled over charcoal in an improvised grill.

Prof. Richard A. Flinn presided at the afternoon technical session, a review of cast metal research at the University of Michigan. P. K. Trojan presented a paper entitled *"The Microbend Test—a New Tool for Evaluating Cast Metal Structures."* Floyd R. Smith, delivered a progress report on *"Dimensional Accuracy and Surface Quality in Shell Molded Castings."* He stated that surface finish did not vary appreciably with resin contents ranging from four to 12 per cent. C. R. Hammond spoke on *"Graphitization in Magnesium-Treated Ferrous Materials."*

E. J. Walsh, Foundry Educational Foundation described the make-up of F. E. F. and told how it assists industry by helping students find careers in the casting industry.

In addition to those previously mentioned, conference officials and committee chairmen were: John A. Van Haver, general vice-chairman as well as publicity chairman; Richard A. Flinn, secretary; entertainment, Lachlan Currie, Gale Mfg. Co., Albion, Mich.; finance, Claude B. Schneible, Claude B. Schneible Co., Detroit; and educational, Jess Toth, Harry W. Dietert Co., Detroit.

Metals Casting Conference leaders, left to right, are: V. S. Spears, conference chairman; J. P. Lentz, program chairman; and R. H. Greenlee, assistant program chairman.

Metals Casting Conference Features Engineered Castings

A. B. SINNETT / *AFS Education Director*

THE 7th Annual Metals Casting Conference was held October 28-29 at the Memorial Union Building, Purdue University, under the sponsorship of the Department of General Engineering and the Michiana and Central Indiana Chapters of AFS. Technical talks covered engineered castings, pattern design, cost savings through work simplification, back slagging and hot blast, front slagging and blast moisture control, automatic moisture control of sand, and problems in the cleaning room.

The meeting was opened by the conference chairman, V. S. Spears, American Wheelabrator & Equipment Corp., who turned the meeting over to P. F. Chenea, head of Engineering Science. Welcome to the meeting was presented by F. C. Hockema, vice-president and executive dean, who greeted the foundrymen on behalf of Purdue and outlined the engineering activities of the university. In response to Mr. Hockema, Wm. W. Maloney, general manager of AFS, talked briefly on the technical program of the American Foundrymen's Society.

Mr. Chenea, as chairman of the morning session, introduced W. G. Ferrell, Auto Specialties Manufacturing Co., who talked on *"Properly Engineered Castings Will Save Your Customer Money."* He stated that castings can do the job better but to get the maximum advantage, it is absolutely necessary that considerable engineering be given to each pattern. In a majority of instances castings can give service that will meet or exceed the tests given competitive forgings and weldments, he said.

The castings industry can show by specific tests and experience that the castings will withstand any comparative testings with forgings, he said. An outstanding example, he pointed out, is in automotive crankshafts where it has just been proven that gray iron having a modulus of elasticity of 16,000,000 to 21,000,000 compared to steel with a modulus of elasticity of 30,000,000 will withstand all comparative tests. In addition, the gray iron will run much quieter than will the steel forging.

It is possible in casting a gray iron crank to give 100 per cent balance to the customer while a forged crank approaches 70% balance, Ferrell said.

Chairman for the afternoon session was Emil Schmidt, Studebaker Corp. He introduced Nelson Damm, Pyle Pattern Co., Muskegon, with the topic, *"Good Pattern Design is Everybody's Business."*

The cost of good pattern design, while a little higher in the beginning due to labor and time, will be more than regained in lower labor and scrap costs. With the foundry of today and its automation and mechanization, Mr. Damm said, it is necessary that patterns and equipment be engineered completely prior to use. The engineering is regulated by such factors as economy, use, weight and even legislation. Therefore, it is difficult to design an ideal pattern for a casting because of the variable existing within a particular plant, he explained.

W. C. Cheek, Central Foundry Div., General Motors Corp., Danville, Ill., discussed costs savings through work simplification. First basic need in a program aimed at controlling and reducing costs is for standardization of operations, he said. Result will be:

(1) More efficient operations through the establishment of standard motion paths; (2) More effective use of labor through better distribution of manpower; (3) A basis for the calculation of accurate efficiencies for the use of management in the evaluation of department and plant performance; and (4) More accurate part costs for developing sales prices and evaluating the cost picture on a piece basis.

Mr. Cheek indicated that in the study of methods improvement, such questions as these might be asked: Is the operator busy? Is the operator necessary? What improvements can be made in operation and equipment? Are supplies efficient and correctly routed? Is lighting correct? Is the work area adequate and the working height correct?

Second basic need, he said, is for people trained in the field of methods engineering. These people will be able to scientifically approach the problem of work simplification through an analysis of product design, processes and

Banquet-goers at Metals Casting Conference heard I. L. Willis, International Harvester.

layout, and worker movements. The third basic need is the development of an active interest in the program on the part of top management, the supervisor, and the worker.

The banquet Thursday evening was attended by some 30 Foundry Educational Foundation and other interested students. Speaker was Ivan L. Willis, International Harvester Co., Chicago; his topic, *"Human Relations — Production and Equitable Prosperity."* He said that the majority of the employees of today's industry understand the importance of a fair day's work for a fair day's pay; therefore it behooves industry to establish sound standards of production and to develop them consistently within their particular plant. He recommended that incentive systems on an equitable basis be used whenever possible.

The majority of employees today are convinced, Mr. Willis declared, that only through increased productivity will they be able to advance their earnings. Many employers are willing to use a share program with the employee where there is evidence of increased productivity. Management should develop the program for production and equitable prosperity, which must include good will, fairness, and equality for all employees, he concluded.

The Friday morning chairman, William A. Zeunik, National Malleable & Steel Castings Co., introduced G. P. Phillips, Manufacturing Research Div., International Harvester Co., Chicago, whose topic was *"Back Slagging and Hot Blast."* He stated that back slagging was relatively cheaper with slightly greater carbon pickup. The prime disadvantage of this method was the short life of the slag hole blocks and the constant repair and maintenance. Mr. Phillips stated that with the many new methods of removing slag that there are still many foundries today that feel the rear slagging operation is best suited for their foundry. For the small and medium-size foundry, this method is still the most economical.

In the discussion of hot blast systems for cupola furnaces, such advantages were mentioned as a fuel saving of up to 25 per cent, reduction in refractory cost, less sulphur pickup, less oxidation of manganese and silicon. Other advantages brought out were maintenance of uniform melting and uniform temperature, faster melting, and higher temperatures at the spout. Most discussion was on the recuperative type and the externally fired type of hot blast systems. All of the recuperative systems mentioned made use of the sensible heat and were operated with blast temperatures of approximately 300 F. In the externally fired hot blast systems, outstanding advantages are immediate blast at the required temperature with a minimum of maintenance. As a final comparison, Mr. Phillips stated that initial costs of recuperative systems were much higher for equipment and installation. This system entails minimum cleaning problems. The externally fired hot blast systems were less costly for installation. However, fuel expense is a necessary consideration.

Conference committee members examining castings are, left to right: Keith E. Glancy, Prof. C. T. Marek, John H. Kauffman, W. E. Patterson, and N. E. Baker.

Following speaker, O. L. Wilhelm, Delco-Remy Div., General Motors Corp., offered the paper *"Front Slagging and Moisture Control."* He stated that use of front slagging eliminated a dirty and laborious process. He also noted that the cupola room walls and equipment were no longer littered with slag wool and ashes and the heat and fumes from the molten slag were kept at a minimum. Front slagging troughs are simple and easily kept in repair, he said.

Summarizing, Mr. Wilhelm stated the following points in favor of the front slagging operation: (1) Elimination of at least two productive operators; (2) Elimination of several safety hazards plus improved working conditions; (3) Very marked improvement in housekeeping; (4) Savings of labor and material in cupola maintenance; and (5) More uniform carbon analysis.

In the discussion of moisture control by refrigeration, Wilhelm showed by use of slides a very definite realtionship between porosity defects and the grains of moisture per cubic foot of air. The humidity curve and the scrap curve were plotted against each other for a six-month period and were found to be surprisingly parallel. It was noted that there was a definite increase in scrap when the humidity was above four grains per cubic foot and a marked decrease when the moisture content was three grains or lower.

To eliminate this moisture problem, the speaker's company inserted a refrigeration unit consisting of a filter and cooling chamber. The air is directed through the filters over the refrigerating coils and is cooled to 40 F. At this temperature, all but three grains of moisture per cubic foot is removed by precipitation. From this point, the air is piped to the cupola.

The final paper of the Friday morning session, presented by W. E. Patterson, Elkhart Foundry & Machine Co., was entitled *"Automatic Moisture Control."* He explained that the automatic moisture control system for sand mixtures in his shop has improved casting quality by elimination of scrap due to varying moisture content of the sand. It has assisted in stabilizing permeability and green strength, and has increased and controlled flowability of the molding sand. It also enables the slinger operators to ram a more consistent mold, he said.

The automatic moisture control system has eliminated need for one supervisor whose sole job was to control the sand coming from the muller, Mr. Patterson said, and has decreased down time due to either too wet or too dry a sand. Decreased maintenance because tempering water enters the mill before the sand has eliminated most of the plow and liner troubles.

At the final session of the conference, S. Franklin Swain, Golden Foundry Co., introduced H. Graber, Studebaker Corp. His subject was *"Problems in the Cleaning Room."* He contended that effective operation of a cleaning room requires good communication between all divisions of the shop and the cleaning room. There is the interfoundry communication which is a weekly meeting concerning such things as general problems, new design equipment, material flow, and operations. Another method of communication is the daily contact which is necessary between the foundry foreman, the melting foreman, and the pattern foreman, since the cleaning room provides the first opportunity for production people to view the end results of the casting process.They should be on hand at the first cleaning station in order that all recognizable defects might be quickly abolished on the molding line, in the melting department, and possibly pattern design.

Conference Chairman V. S. Spears and Prof. C. T. Marek closed the conference with a tribute to the Conference Committee and the program chairman. In addition to Messrs. Spears and Marek, the Conference Committee consisted of Program Chairman J. P. Lentz, International Harvester Co., Assistant Program Chairman R. H. Greenlee, Auto Specialties Manufacturing Co., and the following members: N. E. Baker, Nonferrous Foundries, Inc.; J. A. Barrett, National Malleable & Steel Castings Co.; John H. Kaufman, Studebaker Corp.; W. E. Patterson, Elkhart Foundry & Machine Co.; C. O. Schopp, Link-Belt Co.; and Prof. H. A. Bolz, Prof. R. W. Lindley, and Keith E. Glancy, all of Purdue.

For more data, circle No. 791 on postage-free Reader Service card on p. 17 or 18

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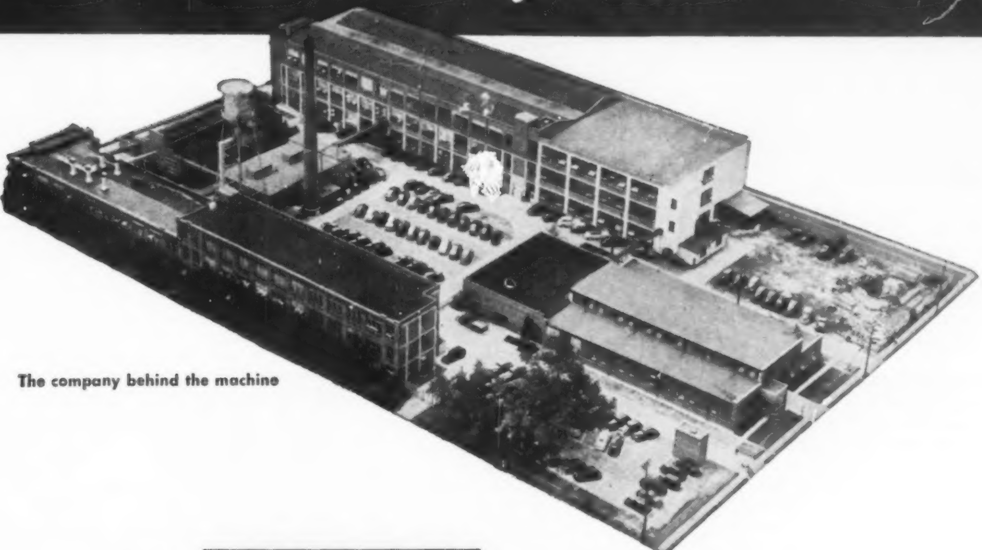

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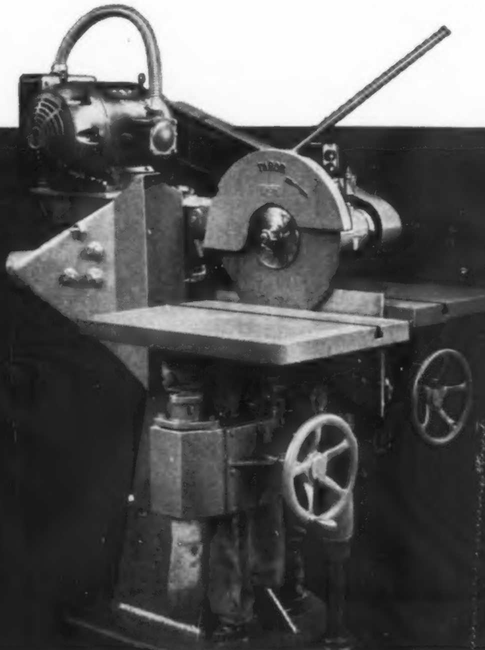

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Photos courtesy Warren D. Lewis, Great Lakes Foundry Sand Co.

Stage All-Canadian Foundry Conference

VERN CARLSON / *Technical Writer*

"FOUNDRYMEN Forward with Canada" was the theme of the Fifth All-Canadian Conference. Held October 28 and 29 at the King Edward Hotel, Toronto, Ont., the meetings featured cost and quality control with additional sessions on pattern engineering, gating design, and pressure molding. Sponsors were the Ontario and Eastern Canada Chapters of AFS.

Conference chairman was Alexander Pirrie, Standard Sanitary & Dominion Radiator Ltd., Toronto. Co-chairman of the Program Committee were A. G. Hawthorne, Canadian Foundry Supplies & Equipment Ltd., Mimico, Ont., and J. K. King, Archer-Daniels-Midland Co., Ltd., Toronto.

The morning of the first day was open for visits to the Toronto plants of National Iron Works Ltd., and Neptune Meters Ltd.

The conference was opened at luncheon by Chairman Pirrie. Mayor Leslie Saunders of Toronto welcomed the foundrymen to his city and to the province of Ontario. He observed that one-third of the production and consumption of Canada was within 100 miles of Toronto and considered the foundry industry an indispensable factor in this development.

H. G. Robertson, American Steel Foundries, Alliance, Ohio, AFS regional vice-president, brought greetings from the national officers and directors and an invitation to every foundryman to attend the dedication of the new AFS Foundry Technical Center in Des Plaines, Ill. Greetings from the Detroit Chapter were extended by H. E. Gravlin, Claude B. Schneible Co., Detroit. Claude Bourassa, Archer-Daniels-Midland Co., Ltd., Montreal, chairman of the Eastern Canada Chapter greeted the conference for his chapter.

The cost and quality improvement sessions included a presentation of the techniques of statistical quality control in the afternoon and a panel session the following morning covering the efforts of five Canadian foundries to improve costs and casting quality.

Chapter and national AFS officials with mayor of Toronto are, left to right: Claude Bourassa, Eastern Canada chairman; Fred Rutherford, Ontario chairman; H. G. Robertson, regional vice-president; Mayor Leslie Saunders; and Alex Pirrie, Ontario past chairman.

F. W. Kellam, Electro Metallurgical Co., Welland, Ont., chairman of the session, introduced D. L. Watson, Holmes Foundry Co., Ltd., Sarnia, Ont., who spoke on *"Foundry Fact Finding for Cost and Quality Improvement."* He said the goal of high production was an organized operation that allows inexperienced labor to step into the job and perform, within minutes, satisfactorily. Although he dedicated his remarks to quality control necessary for such an operation. he recommended tailoring the program to fit any given size and type of foundry operation.

The Friday morning panel session on *"How We Improved Costs and Quality"* had Mr. Watson as moderator. J. P. Lubenkov described the basic cost system of Link-Belt Ltd., Elmira, Ont., which treats each department as a separate enterprise. General overhead and administrative expenses are pro-rated to each department. He told how 15 foundries of similar class in the area share operating cost data which are used as a measuring stick for Link-Belt operations.

Methods used as Fahralloy Canada Ltd., Orillia, Ont., to improve casting quality while reducing costs were reviewed by W. K. Blake. To avoid peak load power costs of electric furnace operation, the production controller, cost controller, and works manager schedule operations a month in advance. This has brought about a saving of $1.08 per ton of metal melted after absorbing a 9 per cent rate increase. The greatest

economy in sand operations, he said, has been wet sand reclamation which has brought about an over-all saving of $4.97 per ton of good castings. Replacing hand additions of core oil by overhead tank with gravity feed through meters effected savings of $2.35 per ton of core sand by eliminating spillage and inaccuracies.

The quality and cost control program required the addition of a cost controller who also sets standards; but, Blake concluded, the clerical staff was reduced by one.

X-Bar-R charts are used extensively at Canadian Westinghouse Co., Ltd., Hamilton, Ont., according to R. Gray, who described the use of this form of statistical control for core and molding sand physicals and metal analyses. The controlled addition of one material to the iron increased tool life 300 per cent and decreased leakers on porosity tests from approximately 8 per cent to 1 per cent.

Of several ways to realize cost savings, J. E. Rehder, Canada Iron Foundries Ltd., Montreal, recommended as most fruitful, the savings possible by increasing yield. He also recommended the showing of "internal circulating load" (sprues, gates, and risers) in cost data.

A. P. Deacon, quality control consultant, Brantford, Ont., presented the statistical quality control program of the Cockshutt Farm Equipment Ltd. (Brantford) foundry. A feature of this program is the requirement that foremen indicate in writing the action taken to prevent repetition of an error or to correct a defect.

Mr. Deacon illustrated a simple ladle addition chart (applicable to the smallest operation) that indicated for every chill depth the amount of addition that should be added for three classes of castings.

Deacon stated that no difficulty was encountered introducing statistical quality control because the workmen had been taken into confidence. The men knew an effort was being made to help them know sooner the kind of work they were doing.

Chairman of the pattern engineering session was Wm. C. H. Dunn, Western Pattern Works, Montreal. Speaker E. T. Kindt, Kindt - Collins Co., Cleveland, blamed failure to make money at patternmaking to over-designed patterns, lack of adequate cost knowledge, poor shop layout, inadequate machinery, inefficient work practices, and lack of proper materials.

Among recent developments he described was a pattern coating that satisfied 27 requirements. Several firms have saved 75 per cent of the time of applying coatings by spraying and eliminating two coats with in-between sanding, he said.

J. W. Bell, Aluminum Co. of Canada, Ltd., Toronto, presided over the session on *"The Effect of Gating Design on Casting Quality."* J. G. Kura, Battelle Memorial Institute, Columbus, Ohio, showed the most recent film on AFS-sponsored gating research which proves the universal advantage of using a well under the sprue to eliminate entrapped gases and turbulence.

Results in Smaller Sprues

Kura said that application of principles of gating disclosed by research in the casting of iron, steel, brass, and aluminum has resulted in smaller sprues, less risering, faster pouring, elimination of screens, and fewer defects.

"Pressure Molding" was the subject of a talk by W. L. Adams, Eastern Clay Products Dept, International Minerals & Chemical Corp., Chicago. He said the process now involves materials, flasks, and pressures which are familiar to foundrymen who appreciate the advantages of a re-usable green sand mold material.

Adams said pressures of 85 to 90 psi are being used in diaphragm molding machines to squeeze a mold to uniform density. Flasks engineered to withstand pressures instead of jolting are often lighter than regular flasks and the molds they make are invariably lighter because they contain less sand.

He said that dimensions across the parting line can be held provided the sand area around the pattern was sufficient, adding that precision was dependent on pattern quality and flask pin and bushing accuracy. Wm. Nuttall, Warden-King Co., Ltd., Montreal, was chairman of this final technical session.

Chairman of the Thursday night dinner was T. Tafel, III, Standard Sanitary & Dominion Radiator Co., Ltd., Toronto. Principal speaker was A. Levenstein, Research Institute of America; his subject was *"Human Relations."*

He explained that major differences are merely accumulations of little differences. These are controllable, he said, if treated continually instead of waiting for the build-up and rupture. Millions of dollars are spent annually to create conditions favorable for sales, he pointed out. It is just as possible to create and maintain favorable conditions that will eliminate industrial friction.

A banquet and entertainment on Friday night concluded the All-Canadian Conference. Speaker was Frank Leahy, Exothermic Alloys Sales & Service, Inc., Michigan City, Ind., who related interesting incidents in his football career.

Conference vice-chairman was Fred Rutherford, Refractories Engineering & Supplies Ltd., Hamilton; L. B. Morris, Gurney Dominion Furnaces Ltd., Toronto, was secretary.

Members of other committees were— Housing, T. W. Myatt, Toronto Pattern Works Ltd., Toronto; Registration, J. R. Morgan, Hamilton Facing Mills Co., Ltd., Hamilton, and J. P. Wilkinson, Wilkinson Foundry Facing & Supply Co., Ltd., Toronto; Plant Visits and Transportation, G. R. Winkworth, Toronto Foundry Co., Ltd., Toronto, and Wm. H. L. Bryce, International Harvester Co. of Canada Ltd., Hamilton.

Co-chairman of Publicity were M. W. Hollands, General Smelting Co. of Canada Ltd., Hamilton, and G. M. Johnston, Neptune Meters Ltd., Toronto; Entertainment and Banquet co-chairmen were C. A. Thompson, Galt Malleable Iron Co., Ltd., Galt, Ont., and J. M. Hughes, Stevenson & Kellogg Ltd., Toronto. The technical committee consisted of F. W. Kellam, Electro Metallurgical Co. of Canada Ltd., Welland, Ont.; T. Tafel, III; Henry Louette, Warden-King Co., Ltd., Montreal; and W. A. Jones, Canadian Westinghouse Co., Ltd., Hamilton.

1954 All-Canadian Foundry Conference banquet featured Frank Leahy as principal speaker.

at annual fall meeting

Steel Founders Stress Washington Situation

GEORGE K. DREHER / *Secretary, SFSA*

A. J. McDonald (left), SFSA president, congratulates L. C. Mertz, following presentation of citation for latter's work in Washington during Korean emergency.

PRESIDENT A. J. McDonald, American Steel Foundries, Chicago, in his opening remarks before the fall meeting of the Steel Founders' Society of America at White Sulphur Springs, W. Va., September 27, stressed and outlined the job ahead for the foundry industry in cooperating with the Business and Defense Services Administration of the Department of Commerce, in the interest of both government and industry.

The foundry industry is foolhardy in not giving considerably more attention to the providing of men to staff the Castings Branch of the Iron and Steel Div. of BDSA, he said. The same is true for other spots in the Government picture which may require representation by the foundry industry.

Mr. McDonald lauded Bradley B. Evans, Empire Steel Castings Co., Reading, Pa., for his service in Washington.

Lawrence C. Mertz, Unitcast Corp., was given a citation at the annual banquet in recognition of his services as consultant to the Castings Section of the Iron and Steel Div. during the Korean emergency. The citation reads:

"Steel Founders' Society of America honors L. C. Mertz . . .

"For his patriotic and unselfish service to his Country and Industry as Consultant to the Office of Price Stabilization during the Korean emergency.

"His knowledge of the Industry helped to make possible an orderly transition in the difficult task of converting from a peacetime to a wartime, controlled economy.

"His willingness to give generously of his time and effort for the common good assisted mightily in the preparation of regulations which met the basic stabilization requirements yet under which the Industry could live and meet the increased production demands.

"His patience in dealing with officials of the stabilization program brought about a clearer understanding of the peculiar problems of the Industry.

"To him the Industry extends its grateful appreciation.

> "By order of the Board of Directors of Steel Founders' Society of America this 27th day of September, 1954".

McDonald also reviewed some of the changes which had taken place in S.F.S.A. during the past six months. Among these was the election of George K. Dreher as secretary, the promotion of J. H. Lowe to the office of assistant technical and research director, and the employment of Jerome M. Hathaway. He called attention to the inauguration of the Management Letter on a quarterly basis. The first issue was available for the meeting. This letter will chart certain statistics of the steel castings industry and regularly report developments in government and American industry of vital concern to S.F.S.A. members.

Continuing his report, McDonald directed attention to the 14 research projects now in process under the direction of the Technical & Research Committee. The complimentary remarks of U. S. Army Ordnance to the Society for its work on their research contract, *"The Effect of Rare Earths on Cast Steels,"* were related with the further information that a third contract has been started and a fourth is under consideration.

Coming up in the near future is a research journal under the auspices of the Technical & Research Committee, which will be published about every four months. This is to review progress

continued on page 90

Claude L. Harrell . . . program appraisal

Earle M. Layman . . . safety contest

Foundry Tradenews

Tabor Manufacturing Co. has become a division of **Turbo Machine Co.,** Lansdale, Pa. The complete line of Tabor equipment will be made in the Lansdale plant. Purchase involved the business name trademark, inventories, patents and licenses of Tabor, but did not include the remaining assets, principally fixed assets, which will be sold at auction.

The National Research Corp. is licensing, on a non-exclusive basis, the NRC Titanium Shape Casting Process which permits the production of sound castings of titanium and titanium alloys with a finish equivalent to that of good sand castings. An important feature of this process is a mold material which withstands the action of molten titanium. The first licensee is **Titanium Casting Corp., Div. of Howard Foundry Co.**

A series of conferences designed to acquaint engineers with the properties and applications of ductile iron has been inaugurated by **The International Nickel Co., Inc.,** whose Development and Research Div. invented and developed this new material. Individual meetings, attended by design engineers, materials engineers, purchasing agents and representatives of management, are being held for companies employing cast or wrought components. The first of these conferences have been held at the **Worthington Corp.,** Harrison, N. J., and at the **M. W. Kellogg Co.,** New York City.

Accurate Perforating, Chicago, has purchased the property at 3436 S. Kedzie Ave. from **Western Foundries.** The newly-acquired propetry gives Accurate an additional 220,000 sq ft of one-story building on 545,000 sq ft of land.

Electric Steel Foundry Co., Portland, Ore., is now accepting orders for .03 maximum carbon stainless steel castings. Over three years of research in metallurgy and melting practice has been spent by ESCO in the development of a practical and economical method of production of .03 maximum carbon stainless steel alloys in the 18-8 and 18-8 mo grades. A brochure giving the complete story of this development is available by writing the company.

Mercast Corp., New York City, will build a new plant in La Verne, Cal. This is one of several steps related to plans for major expansion of the Mercast process as a producer of metallic castings using frozen mercury as a pattern material.

Another improvement in **Frederic B. Stevens, Inc.,** Detroit, customer service program, a new pilot plant for experimental zinc, cadmium, copper and nickel automatic barrel and conventional plating, is now in operation.

Addition of a new air-conditioned building to the Trenton, N. J. plant of **Ajax Electrothermic Corp.,** represents almost a 50 per cent physical expansion of the company's engineering and administrative departments.

Seven plants of the **Electro Metallurgical Co.** and two of the **United States Vanadium Co.** were among 30 organizations presented National Safety Council annual awards for exceptional public service in home accident prevention. The plants were cited for their excellent work in promoting off-the-job accident prevention activities. **Steel Founders' Society of America** was one of 11 trade associations presented the award. The associations were cited for their outstanding work in promoting safety in small business.

All vacuum melting production facilities formerly operated by **National Research Corp.** and **Crucible Steel Co. of America** in Cambridge, Mass. are now being moved to Syracuse, N. Y. The first of several production furnaces installed at the new plant poured its first heat recently and all present furnace capacity will be moved and in operation by the end of the year. A new 220 lb furnace is also being constructed. Upon completion of the move all management, production and sales activities will be centralized at Syracuse.

H. C. Macaulay Foundry Company has published a booklet which shows by word and picture how they mold castings of gray and alloyed iron.

Industrial Crane & Hoist Corp., has moved to new and enlarged quarters at 1536 S. Paulina St., Chicago.

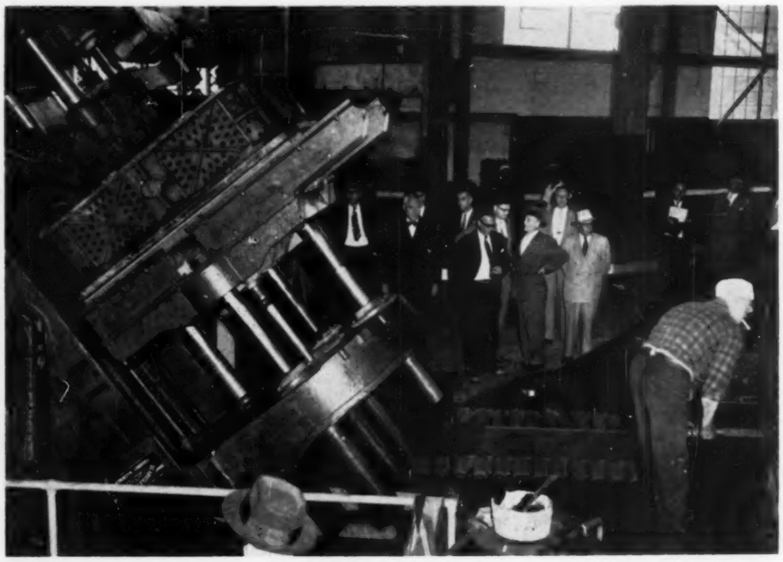
Hitchiner Manufacturing Co., Milford, N. H., has completed a plant expansion program which is expected to increase the production capacity of the company by 50 per cent. By enlarging their die making department, the firm will remove a production bottleneck, thus permitting full utilization of the casting department.

A new corporation has been formed by John W. Cleveland, Raymond G. Pence and George W. Anselman. This corporation, known as **The Whirl-Air-Flow Corp.,** has purchased the Pneumatic Sand Conveyor Div. of **Gerwin Industries, Inc.** Main office of the corporation will be at 4718 Touhy Ave., Lincolnwood, Ill. Free literature explaining the Whirl-Air-Flow System is available on request.

Div. of Acheson Industries, Inc., has opened sales headquarters in Rochester, N. Y. E. A. Lampman, service engineer, **Acheson Colloids Co.,** Port Huron, Mich., will be in charge.

Westinghouse Electric Corp. has opened a plant at Montevallo, Ala., for the manufacture of welding electrodes and brazing rods. The single-story plant is located on a 54-acre site 35 miles south of Birmingham.

Bay State Abrasive Products Co. of Westboro, Mass., has occupied enlarged headquarters for its Chicago operations at 3701 W. 49th St.

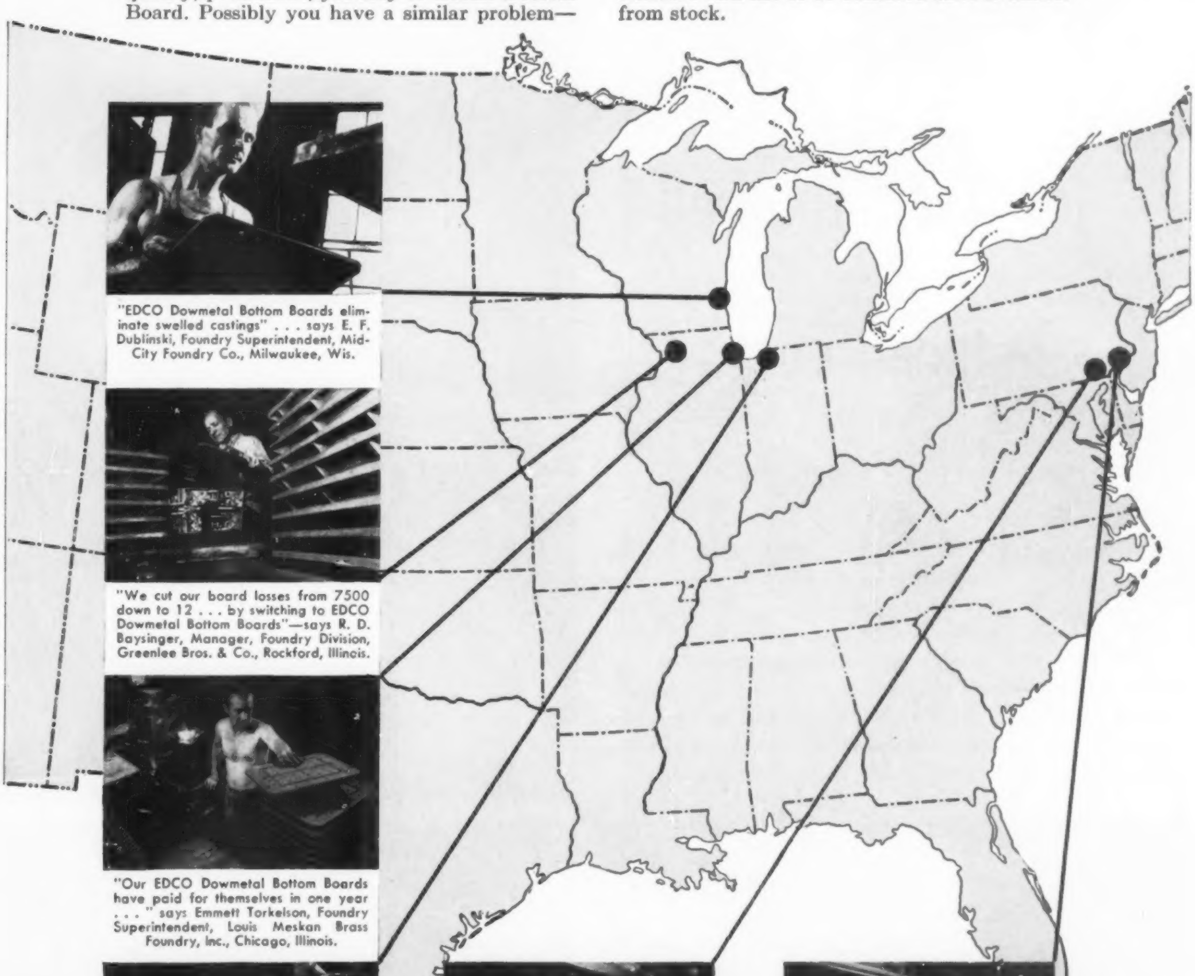


National Iron Div., Canada Iron Foundries, Ltd., recently opened their new Mechanized Pipe Fitting Foundry, for the production of cast iron pipe fittings. Effective October 1, Canadian Iron Foundries merged three of the companies engaged in Foundry operations with the parent company. National Iron Corp. became National Iron Div.; Dominion Wheel and Foundries, Ltd., became Dominion Wheel and Foundries Div., and Gartshore-Thompson Pipe & Foundry Co., Ltd., became Special Products Div. Shown above is roll-over pattern draw machine in motion, with mold clamped in place at National Iron's cast iron pipe fittings plant.

HERE'S WHY these foundries bought Edco Dowmetal Bottom Boards

Results! Satisfaction! Here are just a few of the progressive foundries where Edco Dowmetal Bottom Boards are in use. We have eliminated their Bottom Board problems—with resulting dollar savings—by producing for them a top-quality, permanent, yet easy-to-handle Bottom Board. Possibly you have a similar problem—or one which you feel is a "tough one," without a definite answer. Either way, we would welcome the opportunity to talk to you about it.

Write us, or phone MAnsfield 6-7330 for price schedule and list of 83 standard sizes available from stock.



"EDCO Dowmetal Bottom Boards eliminate swelled castings" . . . says E. F. Dublinski, Foundry Superintendent, Mid-City Foundry Co., Milwaukee, Wis.

"We cut our board losses from 7500 down to 12 . . . by switching to EDCO Dowmetal Bottom Boards"—says R. D. Baysinger, Manager, Foundry Division, Greenlee Bros. & Co., Rockford, Illinois.

"Our EDCO Dowmetal Bottom Boards have paid for themselves in one year . . ." says Emmett Torkelson, Foundry Superintendent, Louis Meskan Brass Foundry, Inc., Chicago, Illinois.

"Rejects reduced to an absolute minimum since using EDCO Dowmetal Bottom Boards" says Bob Petcher, Foundry Superintendent, Josam Mfg. Co., Michigan City, Ind.

"Our EDCO Dowmetal Bottom Boards Hold Up at High Temperatures . . ." says Robert H. Garrett, General Foreman, Lebanon Steel Foundry, Lebanon, Pennsylvania.

"Burning and Breakage loss not a factor since using EDCO Dowmetal Bottom Boards" . . . says Olney Foundry, Link-Belt Company, Philadelphia, Pa.

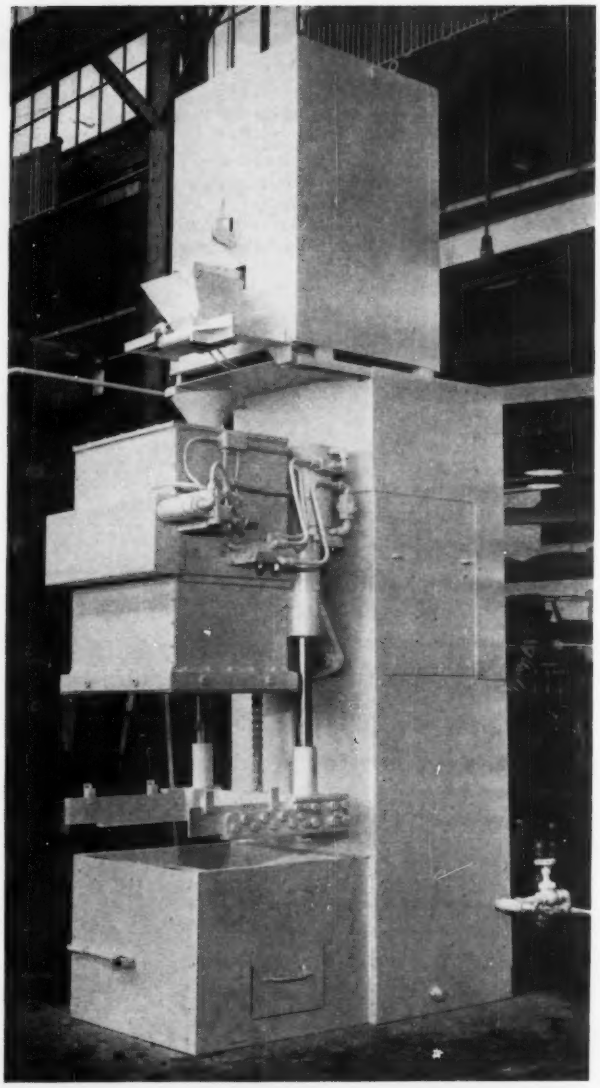
CHRISTIANSEN CORPORATION

210 SOUTH MARION STREET • OAK PARK 2 (Chicago Suburb), ILLINOIS

EDCO DOWMETAL BOTTOM BOARDS • EDCO ALUMINUM INGOT

(ADVERTISEMENT)

New equipment that pays for itself through reduced costs



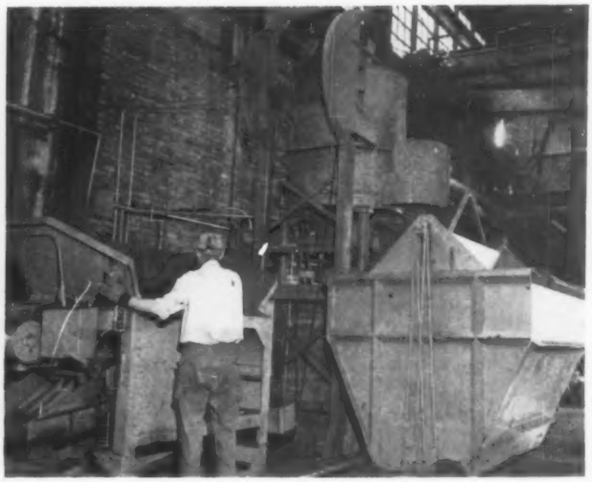
THIS FULLY AUTOMATIC SHELL INVESTMENT UNIT forms four or more perfect shells for patterns up to 24 x 30 inches in size each minute. It features precise investment time control, metered sand resin addition, controlled sand resin rainfall and thorough lamp scavenging. This shell investor may be installed individually and later combined in a complete rotary Formatic Unit. When installed individually and used with pattern dollies, it offers all of the control features so essential to shell molding. *Full information may be obtained by writing to Beardsley & Piper, 2424 N. Cicero, Chicago 39, Ill.*

ALL OF THIS FOUNDRY'S CORE SAND is prepared in this Model 3½ Mulbaro. At the Riverside Foundry, Chicago, Illinois, three barrows are used with a single mulling mechanism permitting full utilization of the Mulbaro's capacity. *For full information write to Beardsley & Piper, 2424 N. Cicero, Chicago 39, Ill.*

IN ONE OF THE BEST small core rooms in the country . . . the Midwest Foundry at Coldwater, Michigan, blows a great variety of miscellaneous cores on B&P Champion Core Blowers. A powered conveyor belt handles the output from eight Champion Blowers. *For full data write to Beardsley & Piper, 2424 N. Cicero, Chicago 39, Ill.*

For more data, circle No. 753 on postage-free Reader Service card on p. 17 or 18

SKIPTROL CUTS COSTS in this gray iron foundry where two Skiptrol-equipped Speedmullor-Preparator units handle the preparation of molding sand. Skiptrol automatically controls the loading of the skiphoist bucket and stops the Preparator or loading belt when the bucket is full. *Full data may be obtained by writing to Beardsley & Piper, 2424 N. Cicero, Chicago 39, Ill.*



NO PITS were required for the installation of the new Model "60" Preparator which is a part of this "50-60" Speedmullor-Preparator unit at the Riverside Foundry, Chicago, Illinois. The "50" Speedmullor is platform-mounted to permit loading of the portable slinger tank at floor level. *Send for a free copy of the Riverside story; Beardsley & Piper, 2424 N. Cicero, Chicago 39, Ill.*

PERFECTLY RIDDLED CORE SAND is riddled directly onto the pattern by this B&P Roller Riddle at the Chemalloy Foundry, Louisiana, Missouri. The automatic Roller Riddle need only be positioned over the core box momentarily and the riddling job is completed. The core box is mounted on a J&J Jolt-Rol-A-Draw and the sand is Speedmullor-mulled. *Full data may be obtained by writing to Beardsley & Piper, 2424 N. Cicero, Chicago 39, Ill.*

THIS SANDSLINGER-CONVEYOR UNIT at the Lindgren Foundry, Batavia, Illinois, successfully handles the foundry's small and medium size work. With Slinger flexibility loose or mounted patterns of any height and of wood or metal construction may be handled with ease. A newly installed Speedmullor provides the mulled all-purpose sand for this operation. *Write for full information to Beardsley & Piper, 2424 N. Cicero, Chicago 39, Ill.*

For more data, circle No. 753 on postage-free Reader Service card on p. 17 or 18

Committee distributing prizes at the September outing of the Central Indiana Chapter from left to right: R. Thompson, W. Zunich, J. A. Barrett and F. Kurtz.

Chapter News

Study Cupola in Buffalo

"Principles of Cupola Operation" is the subject of the final sessions of a series of technical meetings sponsored by the AFS Western New York Chapter. Walter W. Steiner, Worthington Corp., Buffalo, N. Y., will conduct the two sessions covering technical control of cupola melting, including basic principles, charges, and control of metal quality and composition.

Non-members as well as AFS members are welcome to attend without charge these meetings on Wednesday December 1 and 8 from 7:30 to 9:30 pm in Room 308 of the Erie County Technical Institute, 1685 Elmwood Ave., Buffalo. Registration may be made by writing or phoning David Stein, Samuel Greenfield Co., Inc., Buffalo (phone HU-4050), or Harry G. Kassidy, Erie County Technical Institute, Buffalo (phone BE-1441).

The two cupola sessions are the concluding meeting in an educational program which featured two evenings on sand fundamentals with James A. Rankin, Worthington Corp., as instructor, and a three-evening Dietert Sand School conducted by Frank S. Brewster, Harry W. Dietert Co., Detroit.

Southern California

At the October meeting of the Southern California Chapter held at the Rodger Young Auditorium, Los Angeles, 117 members and guests were in attendance. Speaker of the evening was A. L. Kreuer, Orafraction, Inc. His subject was "The Romance of Zircon." He stated that zircon is actually not a chill, although often referred to as one.

Ed Haines, Educational Committee chairman, reports that a plant visitation schedule is now being formulated so that various high school and college students can visit these plants. A new film, "Career in Metal," has been purchased by the Chapter.—*W. G. Stenberg.*

Northern California

The Nineteenth Anniversary Issue Industry Directory and Roster of Members has been published by the Northern California Chapter. Booklet contains alphabetical listing of foundry equipment, supplies and services in Northern California; foundries, pattern shops holding chapter memberships, members of the Northern California Pattern Manufacturers; roster of members, sustaining members and company members.

Central New York

The September meeting of the Central New York Chapter was held at Trinkaus Manor, Oriskany, N. Y., with 99 members attending. Chapter Chairman J. Gibson extended greetings, after which, the meeting was turned over to Jim Ochsner, vice-chairman, who introduced the guest speaker, Howard A. Wilder, Vanadium Corp. of America, Detroit, who spoke on "Modern Cupola Operation." Mr. Wilder discussed all phases of cupola operation.—*Bruce R. Artz.*

Rochester

W. R. Jaeschke, Whiting Corp., Harvey, Ill., was guest speaker at the October meeting of the Rochester Chapter held at the Hotel Seneca. His subject was "Cupola Operation." Melting metal in a cupola is one of the oldest methods of melting iron, and it is gaining more popularity every day, he said. The reason is the low operating cost and simplicity in design and operation.—*H. G. Stellwagen.*

Western New York

The Western New York Chapter held its October meeting at the Sheraton Hotel, Buffalo, N. Y. H. Gordon Robertson, American Steel Foundries, Alliance, Ohio, was guest speaker and his subject was "What AFS Has to Offer Management." He outlined the fundamental purpose of AFS, and pointed out what members get for their dues. He covered Technical Activities, Publications, Research, Education, Safety, Hygiene & Air Pollution Control and Financing to demonstrate the value received for dues. National Director Thomas Kaveny, Jr. also spoke on AFS work.—*Roger E. Walsh.*

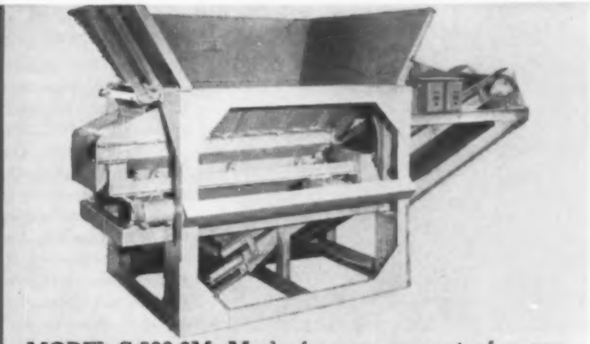
Eastern New York

"Casting Defects" was the subject of William A. Hambley, Chas. A. Krause Milling Co., at the October meeting of

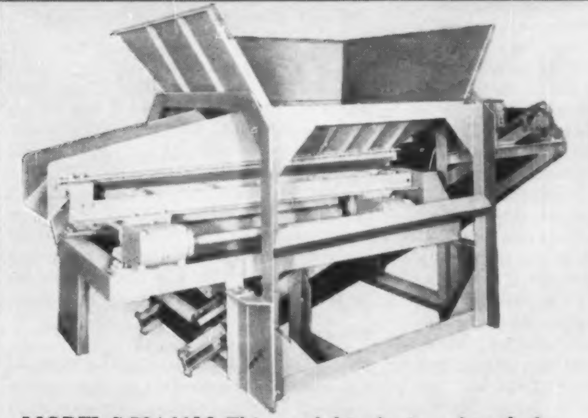
continued on page 86

Talking things over at the October meeting of the Central Illinois Chapter are left to right: B. Bevis, chapter chairman; A. A. Agostini, guest speaker, and G. Rockwell, technical chairman.

"mechanization" YOU can afford!



MODEL S-522-9M. Made for use as part of a centralized sand system. The large open-sided hopper directs the complete charge from a front end loader onto a Royer Shake-Out where the large scrap is riddled out. Magnetic separation removes the fine scrap; sand is discharged into a Royer Sand Separator and Blender or the skip hoist to a muller.



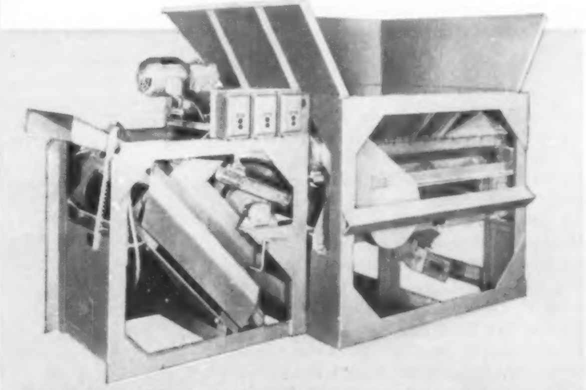
MODEL S-724-11M. This model is designed to shake-out castings and clean sand in one operation. Sand and castings scooped from the molding floor are charged into the hopper and onto a Royer Shake-Out. Castings are discharged at one end at proper height for feeding a table or conveyor where they can be sprued and sorted. Completely cleaned sand is discharged at the opposite end.

The new series of Royer "Scrap Control", with its versatility of application, can supply a varied amount of mechanized casting removal, sand cleaning and conditioning. Here is a unit that puts "mechanization" within the reach of all . . . supplying the benefits of labor saving and production line operation at lowest possible cost.

Take this opportunity to cut down the high cost of hand labor in your sand conditioning operations. Verified results show up to 50% of a night crew released for other work, with the damage by tramp iron to pattern equipment eliminated and scrap losses reduced 75%. We will be glad to study your operation and recommend the proper equipment . . . no obligation, of course.

CHECK THESE FEATURES

1. **Up to 60 tons of clean sand per hour.**
2. **No pits . . . no excavating.**
3. **Low receiving hopper.**
4. **High sand and scrap discharge.**
5. **Rugged Shake-Out utilized as a riddle.**
6. **No screens to clog.**
7. **Easily made portable.**
8. **Readily relocated.**
9. **Four-sided 5 ton capacity hopper available for all units.**



MODEL S-522-5MR. Here is a complete packaged sand cleaning and conditioning unit. Fed by front end loader, the sand is cleaned by a Royer Shake-Out and magnetic separator, tempered and given final preparation by a Royer Sand Separator and Blender. Unit can be moved by overhead crane, setting up the conditioning operation where desired.

Export Department, 306 W. Washington Blvd.
Chicago 6, Ill., U.S.A. Cable: ASMAN

Foremost in Sand ROYER *Conditioning Equipment*

ROYER FOUNDRY & MACHINE CO. 155 PRINGLE ST. KINGSTON, PA.

Bruce Simpson, National AFS Vice-President, left, being presented with a hand-tooled traveling bag at the September meeting of the Mexico Chapter by N. S. Covacevich, chapter chairman.

Chapter News

continued from page 84

the Eastern New York Chapter held at Panetta's Restaurant, Memands, New York. The speaker pointed out that a defect must be diagnosed as to type before correcting it. He divided defects into three classes: 1. Major defects for which there is no hope of salvage by any economical means; 2. Borderline defects where there is some doubt as to whether it is cheaper to scrap or save the casting, and 3. Defective castings which require any work over and above normal procedure.—*L. J. DiNuzzo.*

Ontario

The Ontario Chapter held its September meeting at the Royal Connaught Hotel, Hamilton, Ontario, with Chapter Chairman F. J. Rutherford presiding. Guest speaker, W. C. Dunn, Western Pattern Works, Montreal, was introduced by R. Robertson, International Harvester Co. of Canada Ltd., Hamilton, and chairman of the technical session. Mr. Dunn spoke on "Plastics in Pattern Making," and pointed out that while wood was the most widely used pattern material, it was subject to shrinkage, distortion and change of dimensions. Metal patterns will keep their shape and stand up to hard usage but are more expensive to make and are heavier. Phenolic plastic patterns are light in weight and will not change their shape or dimensions even under the most unfavorable conditions, he said.—*L. Humphreys and D. Magder.*

British Columbia

Saturday, October 2 saw some 120 foundrymen and friends participate in the British Columbia Chapter's Salmon Derby. Seven prizes were awarded as follows: 1st prize, Gordon May, Canadian Metal Co., Ltd.; 2nd prize, Donald Dolman, McLean & Powell Iron Works, Ltd.; 3rd prize, Jim Hornby, Balfour Guthrie (Canada), Ltd.; 4th prize, Matthew Hill, Canadian Sumner Iron Works, Ltd.; 5th prize, Fred Samuels, Canadian Customs; 6th prize Dave Peck, Maple Leaf Pattern Works, Ltd.; and 7th prize Frank Kerley, Tidewater Shipping Co. —*J. T. Hornby.*

Eastern Canada

The October meeting of the Eastern Canada Chapter was held at the Sheraton Mount Royal in Montreal. Guest speaker was S. L. Gertsman, Head Physical Metallurgy Dept., of Mines and Surveys, Ottawa, Can. His subject was "Desulphurization of Iron and Steel." Mr. Gertsman explained why we have to desulphurize. Low sulphur in iron, means, the use of more scrap, less chilling and less ferro-manganese, he pointed out. Low sulphur, in nodular iron, means the use of a smaller quantity of inoculation agent, and low sulphur in tears.—*P. von Colditz.*

Philadelphia

The October meeting of the Philadelphia Chapter was held at the Engineers Club, Philadelphia. This meeting, last year, and this year has been named the "William B. Coleman Night," and will continue to be so called in future years. Donald Bryden, Philadelphia Bronze and Brass Co., was honored for his services as past chairman. The Lew Lane memorial presentation was made by Warren Brown to the son of Mr. Lane, Russell Lane. Clyde Jenni, General Steel Castings Co., Eddystone, Pa., explained the meaning of the W. B. Coleman Night and Scholarship Award which is to be given annually. The scholarship is at the Penn State University and is in the sum of $500 toward the education of a student interested in the foundry vocation. Frank Steinbach, FOUNDRY, spoke on the "Future of the Foundry Industry." He spoke of the advances made by the foundries and affiliated industries in regards to equipment within the last 50 years.—*Charles R. Sweeny.*

Northwestern Pennsylvania

Chairman Bailey D. Herrington presided at the first meeting of the year of the Northwestern Pennsylvania Chapter held at the Erie Moose Club. Guest speaker was Howard A. Wilder, Iron Foundry Div., Vanadium Corp. of America, and his subject was "Cupola Operation." He discussed Cupola height, height of bed, size of coke and slag color and what effect they had on good economical operation.—*Roy A. Loder.*

Quad City

W. J. Rendall, Missouri Coke & Chem. Div., Great Lakes Carbon Corp., was guest speaker at the October meeting of the Quad City Chapter, held at the Hotel Fort Armstrong, Rock Island, Ill. His subject was "Coke and It's Relation to Cupola Operations." A sound film, on the manufacture of coke, prepared by Great Lakes, "The Magic Stone," preceeded Mr. Rendall's talk. At the September meeting C. C. Fye, John Deere Harvester Works, led two panel discussion talks, "Molding Methods" and "Gating and Risering."—*G. F. Thomas.*

Corn Belt

The September meeting of the Corn Belt Chapter was held at the Rome Hotel, Omaha, Neb. H. J. Heine, AFS Technical Director, was guest speaker. He spoke on "Gating and Risering." Through the use of high speed film, it was shown how a mold cavity is filled, and what action is carried on in the mold till all the air is forced out. He stressed that the services of AFS are always available to any foundryman—*Eugene Hagedorn.*

Mo-Kan

O. Jay Myers, Archer-Daniels-Midland Co., was guest speaker at the September meeting of the Mo-Kan Chapter, held at the Fairfax Airport Restaurant, Kansas City, Kan. His subject was, "Core Sand." At the October meeting Walter R. Jaeschke, Whiting Corp., spoke on "Cupola Operation"—*C. W. Boettcher.*

Detroit

The September meeting of the Detroit Chapter was held at the Detroit-Leland Hotel, Detroit. It was the first Ladies

Drawing for attendance prizes at the September outing of the Birmingham District Chapter, held at Cascade Plunge, Birmingham. G. Whelchel, right foreground, presiding and sitting, left, "Pop" Pollard, chapter chairman.

Night held by the chapter and it is now planned as an annual affair. A presentation was made to Mr. and Mrs. Ralph E. Lee in recognition of the fact that they exemplify the ideal "foundry couple." Also honored was Frank Riecks, Ford Motor Co., for his efforts on behalf of the new AFS headquarters—*Jess Toth.*

Central Michigan

John G. Kura, Battelle Institute, was guest speaker at the October meeting of the Central Michigan Chapter held at the Hart Hotel, Battle Creek, Mich. His topic was "The Effect of Gating Practice." Technical chairman was Douglas Strong, Foundries Materials Co., Coldwater, Mich., and Lachlin Currie, Gale Mfg. Co., Albion, Mich., chapter chairman, presided—*L. Heisler.*

Western Michigan

The October meeting of the Western Michigan Chapter, held at Bill Sterns, Muskegon Heights, Mich., was attended by 140 members and guests. Guest speaker, Thomas E. Eagan, Cooper-Bessemer Corp., spoke on "Nodular Iron." Numerous slides illustrated the technical data. Dinner speaker was George W. Cannon, Sr., Campbell, Wyant & Cannon Foundry Co.—*Wilson W. Hicks.*

Saginaw Valley

Past chairman of the Saginaw Valley Chapter were honored on the "Tenth Anniversary Meeting" held October 7, at Frankenmuth, Mich. C. B. Schneible, AFS National Director, presented certificates to past chairmen C. Morrison, J. H. Smith, M. V. Chamberlin, O. Sunstedt, R. Klawuhn, A. Edwards, K. Priestley and F. J. McDonald. Mr. Sunstedt gave a talk on the formation of the chapter.—*N. Sheptak.*

Mexico City

The September meeting of the Mexico City Chapter was in honor of B. L. Simpson, AFS National Vice-President. Mr. Simpson spoke on "The History of the Foundry Industry," and used slides to illustrate his talk. Almost every foundry in the Mexico City Area was represented. A hand-tooled traveling bag was presented to Mr. Simpson by the chapter in a token of appreciation. The chapter plans to start a series of classes for foundry workers and a course in foreman training. The classes will be on molding, core making, cupola operation, shop mathematics, blue print reading, etc. The Chapter Manual is now being translated into Spanish—*N. S. Covacevich.*

Texas

Some 75 members and guests of the Texas Chapter attended the September meeting to hear L. D. Richards, Eutectic Welding Alloy Corp. speak on "New Developments in Foundry Welding." His talk was accompanied with slides. The San Antonio Section of the Texas Chapter held its September meeting at the Alamo Iron Works. A safety film "Once Too Often" was shown. A casting problem clinic on aluminum and steel was also held—*W. A. Bearden and G. H. Hartwell.*

Toledo

Toledo Chapter held its October meeting at the Toledo Yacht Club with C. E. Eggenschwiler, chapter chairman, presiding. Guest speaker, W. L. Adams, Champion Industries, Charlotte, Mich., was introduced by Wayne Camp, program chairman. Mr. Adams spoke on the pressure molding process. He gave three factors needed to regulate this process: good quality pattern and flask equipment of good strength and mold shape clearance; high molding pressure, as high in some instances as 100 to 600 psi; a four-screen sand of good flowability bonded with Southern Bentonite or a plastic agent and cellulose—*G. W. Davison.*

Wisconsin Chapter President R. V. Osborn, left, and guest speaker T. E. Barlow at the October meeting.

Oregon

Oregon Chapter held its October meeting at the Columbia Athletic Club, and featured a panel, discussing casting defects, their causes and remedies. Serving on the panel were: Ernst Buck, Rich Mfg. Co.; Hal Story, Oregon Brass Works; Herb Tatham, Pacific Steel

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Calendar of Future Meetings and Exhibits

December

1-3 . . National Association of Manufacturers
Waldorf-Astoria Hotel, New York, N. Y. Annual Meeting.

1-4 . . American Institute of Mining & Metallurgical Engineers
Hotel William Penn, Pittsburgh, Pa. Electric Furnace Steel Conference.

1-5 . . American Welding Society
International Amphitheatre, Chicago. Annual Fall Meeting.

6-11 . . Brazilian Society for Metals
Sao Paulo, Brazil. Tenth Annual Meeting.

1955

January

21 . . Malleable Founders' Society
Hotel Cleveland, Cleveland, Ohio.

24-27 . . Plant Maintenance & Engineering Show
International Amphitheatre, Chicago.

February

10-11 . . Wisconsin Regional Foundry Conference
Hotel Schroeder, Milwaukee. Sponsored by AFS Wisconsin Chapter.

14-17 . . Industrial Ventilation Conference
Michigan State College, East Lansing, Mich.

17-18 . . Southeastern Regional Foundry Conference
Tutwiler Hotel, Birmingham, Ala. Sponsored by AFS Birmingham and Tennessee Chapters.

March

9-10 . . Foundry Educational Foundation
Hotel Cleveland, Cleveland. College-Industry Conference.

14-15 . . Steel Founders' Society of America
Drake Hotel, Chicago. Annual Meeting.

14-18 . . American Society of Tool Engineers
Shrine Auditorium, Los Angeles. First Western Industrial Exposition.

25-26 . . California Regional Foundry Conference
Huntington Hotel, Pasadena, Calif. Sponsored by AFS Northern California and Southern California Chapters.

28-Apr. 1 . . American Society for Metals
Pan-Pacific Auditorium, Los Angeles. Ninth Western Metal Congress and Western Metal Exposition.

April

18-19 . . Third National Air Pollution Symposium
Pasadena, Calif.

May

23-27 . . American Foundrymen's Society
Houston, Texas. 59th Annual Convention. Non-Exhibit.

June

15-17 . . American Society of Training Directors
Ambassador Hotel, Los Angeles. Annual Convention.

16-18 . . Malleable Founders' Society
The Greenbrier, White Sulphur Springs, W. Va. Annual Meeting.

20-26 . . International Foundry Congress
London, England. Host: The Institute of British Foundrymen.

Left to right: Fred McGee, Jim Blake and John Drenning enjoy a rest during the Tennessee Chapter picnic held in September on Lake Chickamauga.

Chapter News

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Foundry; Vince Belusko, Electric Steel Foundry; Milan Sepich, Western Foundry Co., and Bob Burns, Pacific Chain and Mfg. Co. Harry Czyzewski, Metallurgical Engineers, acted as moderator —*Bill Watkins.*

Northeastern Ohio

Nearly 200 members of the Northeastern Ohio Chapter turned out to pay tribute to F. Ray Fleig, Smith Facing & Supply Co., Cleveland for his 17 years of continuous service to the chapter. Mr. Fleig was presented with a gift of luggage in recognition of his service to the chapter, industry and the government. Technical speaker, George A. Riley, American Brake Shoe Co., N. Y., discussed "Safety in the Foundry." The patternmaking division of the chapter assembled separately after dinner to hear Owen S. Willson, Dougherty Lumber Co., Cleveland, discuss "Woods Used in Patternmaking." Lester B. Knight, Lester B. Knight & Associates, Inc., Chicago, was the guest speaker at the September meeting of the chapter. His subject was "Modernization of Foundries."—*Byron E. Kennel and Jack C. Miske.*

Central Ohio

Dan Krause and Karl Presser, Gray Iron Research Institute, were guest speakers at the October meeting of the Central Ohio Chapter. Their subject was "How to Make Good Castings." Mr. Krause listed the following seven points as the major defects in gray iron; wrong analysis, misruns, pin holes, porosity, kish, high sulphur and shrinkage.—*Eldon Boner.*

Ohio State

The October meeting of the Ohio State University Student Chapter was called "Meehanite Evening," and was presented by Hamilton Foundry and Machine Co. officials: J. Leaverton, J. Voss and A. Carpenter. A film, "Meehanite Means Better Castings," was also shown. Student officers presiding were: G. Greenwood, chairman; H. Hunt, vice-chairman; G. Vaughn, treasurer, and W. F. Clutton, secretary. Industrial advisors are: P. Eubanks, Ohio Steel Co. and D. Marsh, Cooper Bessemer Corp—*W. F. Clutton.*

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Achille Brizon (right) congratulates Màrio Olivo, Italy, on his receipt of the International Award of Honor

Hold 1954 International Foundry Congress

THE 1954 International Foundry Congress was held Sept. 19-26 in Florence, Italy, with the Associazióne Italiana di Metallurgia playing host to foundrymen and delegates of orginizations belonging to the International Committee of Foundry Technical Associations. Represented on the committee, in addition to the Italian association, are the American Foundrymen's Society, and the technical foundry organizations of Belgium, Denmark, France, Great Britain, India, Netherlands, Norway, Spain, Sweden, and Switzerland.

AFS representative to the Florence meeting were National Director C. V. Nass, A. P. Gagnebin, and Vincent Delport.

Presiding during the congress was Achille Brizon, representing France. As president of the International Committee, he presented the Award of Honor of the International Committee to Mario Olivo of Italy. The Institute of British Foundrymen was invited to nominate the candidate for the award in 1955 since the International Congress will be held in London next year.

Yngve Granström of Sweden was unanimously elected president for the year 1955. Switzerland was invited to nominate the vice-president for the coming year. George Lambert of the Institute of British Foundrymen was elected committee secretary.

The International Committee accepted invitations to meet in London in 1955 and Germany in 1956. In addition to meetings of the International Committee, the following committees held meetings for which official minutes will be issued later: Testing Cast Iron, Foundry Defects, and Dictionary of Foundry Terms.

Question of honorary membership on the International Committee was placed in the hands of a Past Presidents Steering Committee consisting of: Achille Brizon, France; L. N. Shannon, United States; R. Deprez, Belgium; V. C. Faulkner, Great Britain; T. Leonard, Belgium, F. W. E. Spies, Netherlands; and Vincent Delport.

Part of group attending the closing ceremony of the 21st International Foundry Congress in Palazzo Vecchio, Florence, Italy, which witnessed presentation of International Award of Honor.

SFSA Meeting

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of research projects under way within S.F.S.A. and to include practical condensations of research articles in both American and foreign magazines of interest to the steel casting industry.

Program Appraisal Committee Chairman Claude L. Harrell, Sterling Steel Casting Co., East St. Louis, Ill., presented the committee's report on Tuesday morning, September 28. This report analyzed over 30,000 individual questions asked the members of the society concerning the future program of the Steel Founders. The report is being published and distributed to members. President McDonald commended the committee which, in addition to Chairman Harrell, consisted of Cleve H. Pomeroy, National Malleable Steel Castings Co., Cleveland, and A. M. Andorn, Penn Steel Castings Co., Chester, Pa.

Other features of the program included a talk on *"Failures in Metals"* by Everett Chapman, consulting engineer, West Chester, Pa.; *"Appraisal of the Business Scene"* by Dr. Martin Gainsbrugh, chief economist, National Industrial Conference Board, New York; and *"Europe—A Facet of America's Future"* by Spencer D. Irwin, *Cleveland Plain Dealer*.

Quiz Answers

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Here are the safety rules being broken in the pictures on p. 55. How many could you identify?

1. Do not lift objects that are too heavy to handle alone without strain.
2. Do not throw objects or otherwise distract workers.
3. When possible, push heavy portable loads rather than pull them.
4. Goggles and eyeshields must be worn wherever eye hazards exist.
5. Do not use compressed air for cleaning clothes, or general cleaning of machinery.
6. Never operate machinery without authorization.
7. Never make repairs or alterations to electrical tools or connections without proper authorization.
8. Running in company buildings or on company grounds is prohibited.
9. Work areas and aisles must be kept clear of unnecessary obstructions.
10. Scuffling and "horseplay" are forbidden.

Council Changes Its Name

American Council of Commercial Laboratories will be known in the future as the American Council of Independent Laboratories, Inc.

A change of name has been the subject of extended consideration over a period of years. A definite vote of members has registered a strong preference for the substitution of the word "independent" for "commercial." The new name has been well received and the objective observers have commented that the name is more descriptive of the function of professional consulting laboratories.

New Safety Book Available

More than 90 safety devices which have been tried and proven effective in plant use are described in National Safety Council's new book, "Safety Devices and Ideas."

The devices were originally part of a safety gadget show presented during the chemical sessions of the 1953 National Safety Congress. Although designed for use in chemical plants, the devices have application in other industries as well. Most of the devices are not commercially available, having been conceived and constructed by plant personnel to meet some particular hazard.

Each idea is illustrated with a large photograph which shows clearly the details of construction. The text accompanying the pictures gives other pertinent data.

"Safety Devices and Ideas" is available for $1.25 to Council members and $2.50 to others. For further information write National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Members and guests attending the September meeting of the Tri-State Chapter at the Alvin Hotel, Tulsa, Okla., from left, D. W. McArthur, Oklahoma Steel Castings Co.; Willis H. Mook, Bethlehem Supply Co.; guest speaker O. Jay Myers, Archer-Daniels-Midland Co.; Juan Bennesar, professor emeritus, University of Buenos Aires.

Chapter News

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Birmingham

The October meeting of the Birmingham District Chapter was held at the Tutwiler Hotel, Birmingham, Ala. Prior to the technical session, E. E. Pollard, chapter chairman, gave a coffee talk on "Aims and Desires of AFS—Birmingham District Chapter." Technical session took the form of two panel groups, one considering melting practices for ferrous metals, and the other on melting practices for non-ferrous metals. Chairman of the ferrous metals panel was J. E. Reynolds, U. S. Pipe and Foundry Co. Panel members were: J. R. Cardwell, S. F. Carter, A. N. Garrison and Mark Adkinson. L. H. Durdin, Dixie Bronze Co., was chairman of the non-ferrous panel. Members were: B. Jenkins, A. Orazine and A. Turner. In September the chapter held its 21st Annual Outing at Cascade Plunge, Birmingham. Highlight of the day was the drawing for prizes; G. Whelchel presided. Outing Committee was comprised of W. K. Bach, H. Guthrie, J. Minter, E. J. Warwick and T. Turner.—*J. A. Wickett.*

Tri-State

Walter R. Jaeschke, Whiting Corp., Harvey, Ill., was guest speaker at the October meeting of the Tri-State Chapter, held at Wilder's Cafe, Joplin, Mo. Mr. Jaeschke spoke on "Cupola Operation," and used slides, charts and experimental castings to support his talk. He stressed the importance of bed height, wind volume and cubic feet of air per minute in accurately and efficiently operating the cupola. Oklahoma Steel Castings Co. was one of the firms visited by the school teachers October 7 during business-education week in Tulsa—*A. M. Fisher.*

Timberline

Telfer Norman, Climax Molybdenum Co., was guest speaker at the October meeting of the Timberline Chapter, held at the Oxford Hotel, Denver, Col. His subject was "Climax Operations and Further Uses for Molybdenum." He pointed out that Climax is now milling approximately 30,000 tons of ore per day, which runs about four lb of molybdenum per ton, with small quantities of tin and tungsten—*A. D. Neal.*

Central Indiana

The October meeting of the Central Indiana Chapter had as its guest speaker, Frank Steinebach, Editor of FOUNDRY. His subject was "Can We Sell More Castings?" He reviewed the foundry industry from the beginning of the century to the present day. The chapter held its annual stag outing at the Lake Shore Country Club, Indianapolis, in September.—*C. R. Jones.*

Tennessee

The Tennessee Chapter held its annual picnic September 10 at Camp Columbus on the shores of Lake Chickamauga, near Chattanooga. About 400 members and guests attended. Charles Chisolm, chapter chairman, was in charge of arrangements. Hal Roach, chapter secretary-treasurer assisted. The Food and Drink Committee was headed by T. A. Johnson, W. D. Davis and Harvey Jarnigan—*W. F. Hetzler.*

Central Illinois

The October meeting of the Central Illi-

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Chapter News

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nois Chapter was held at the American Legion Hall with 150 members and guests in attendance. Guest speaker was A. A. Agostini, Grede Foundries, Inc., and his subject was "The Relationship of the President and the Sweeper." The responsibility of management to labor was cited, the importance of teaching higher morale within the work group and an explanation as to how this can be accomplished, were the highlights of his speech—*C. J. Turner.*

Cincinnati

Almost 100 members and guests of the Cincinnati Chapter were present at the October meeting, held at the Cincinnati Club. Program chairman H. F. Greek, presided and vice-program chairman J. D. Sheley introduced the guest speakers, Prof. F. E. Westerman, University of Cincinnati and William J. Martin, Jr., Peninsular Grinding Wheel Sales Corp. Prof. Westerman presented ten certificates of scholarship to students from the University; F. P. Fazzari, J. T. Gavin, J. M. Mann, T. D. Cooper, D. M. Kohler, W. D. Martin, W. J. Koenecke, W. Kemp, J. J. Rataiczak and R. Wilson. Present at the awards were G. H. Tompkins, Chairman of the F.E.F. and W. H. Hoblitzell and R. A. Van Wye professors at the University. Mr. Martin climaxed the meeting with a film "Play It Safe," on how grinding room supervision and personnel can guard against avoidable grinding wheel failures and resultant physical injuries—*G. L. Brunsman.*

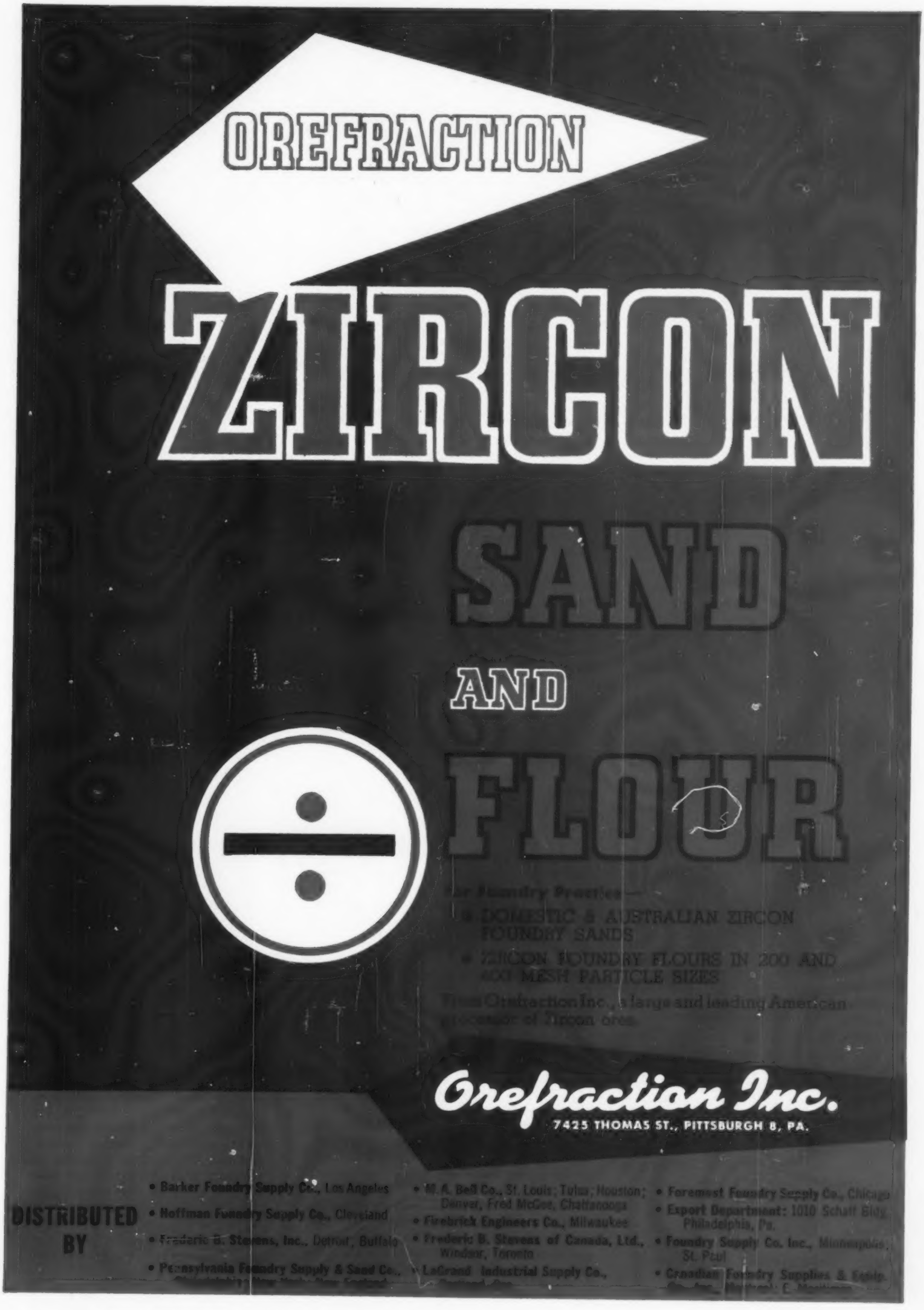
St. Louis

Over 100 members and guests were present at the October meeting of the St. Louis Chapter to hear Hans J. Heine, AFS Technical Director, speak on "A New Approach to Improvement of Casting Design." Mr. Heine discussed the *continued on page 94*

John A. Van Haver

Duncan M. Wilson

In the November issue of AMERICAN FOUNDRYMAN we transposed the pictures of John A. Van Haver, Chairman of the Western Michigan Chapter, and Duncan M. Wilson, Chairman of the Rochester Chapter, in the AFS Chapter Chairman Column. Here are the pictures correctly captioned.



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Chapter News

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basic causes of stress concentration and ways of redesigning to eliminate these stresses. In line with his remarks on stresses, he went into directional solidification and its relation to proper casting design—*Jack Bodine.*

Chesapeake

The September meeting of the Chesapeake Chapter consisted of an all-day visit of the Sparrows Point Plant of the Bethlehem Steel Co. Among operations visited were: blast furnaces, open hearth, soaking pits, blooming mill and sheet and tin mill—*Henry M. Witmyer, Jr.*

Chicago

The November meeting of the Chicago Chapter, held at the Chicago Bar Association, was designated as Robert E. Kennedy Scholarship Night. P. S. Webber, University of Illinois, recipient of the Kennedy Award, was presented a check by Chapter Chairman R. L. Doelman.

After the presentation, members adjourned to the various round table meetings. At the Gray Iron & Steel Div. Arthur Clem, American Colloid Co., spoke on "Manufacture of Bentonite" and E. W. Clear, Eastern Clay Prod., discussed "Uses of Bentonite." Verne Righter, Central Foundry Div., GMC, spoke on "Molding Problems" at the Malleable Div. Gating and Risering panel for the Non-Ferrous & Pattern Div., consisted of George Lavin, C. K. Faunt, E. E. Henry and S. H. Ahnell. "Responsibilities of the Maintenance Superintendent," was the subject of George H. Glos, Pettibone Mulliken Corp., at the Maintenance Div. session. A. A. Evans, International Harvester Corp., Indianapolis, spoke on "Practical Applications of Foundry Quality Control" at the October meeting of the Chapter. He supplemented his speech with various slides—*J. S. Groh.*

Other Organizations

Reading and Conestoga

One hundred and fifty members of the Reading Foundrymen's Association and the Conestoga Foundrymen's Association of Lancaster attended an annual joint meeting at the Berkshire Hotel, Reading, Pa., in October. H. H. Kessler, Sorbo-Mat Process Engineers, St. Louis, was guest speaker and outlined four areas where economies may be affected in foundry operations. He listed these as overhead, purchasing and melting of metals, purchasing of other raw materials, and labor. The speaker was introduced by H. P. Good, technical chairman. J. Woodward, president, was in charge of the meeting. Prior to the dinner meeting, visitors toured the Textile Machine Works plant in Wyomissing, Pa. —*W. I. Cassidy.*

AFS Chapter Chairmen

Robert L. Doelman, sales engineer with Miller & Co., is president of the AFS Chicago Chapter and has been vice-president, program chairman, and secretary of the group. He is a member of the Green Deformation Committee and is chairman of the Committee on Elevated Temperature Properties of Iron Molding Materials. He is co-author of three papers in AFS TRANSACTIONS. Born in Brooklyn and educated in Canada, he worked for Electric Steel Ltd., Harry W. Dietert Co., and M. L. Doelman, before joining Miller.

Bailey D. Herrington, chairman of the Northwestern Pennsylvania Chapter of AFS, is sales engineer for Hickman, Williams & Co. A charter member of the Northwestern Pennsylvania group and continuously active in its affairs, he has served as vice-chairman, program chairman, director, and as secretary. Born in Braznell, Pa., he was educated in Pittsburg, Pa., schools. Joining Hickman, Williams & Co. in 1925, he has supplemented his practical background with evening courses at Carnegie Institute of Technology.

AFS Chapter Chairmen

Raymond M. Meyer, general core room foreman of Ohio Steel Foundry Co. at Springfield, Ohio, is chairman of the Central Ohio Chapter of AFS. He has been vice-chairman for a year, treasurer for two years, and a director for three years. Starting at Ohio Steel as a laborer in 1939, he served as inspector, and later as sand supervisor. His higher education includes a number of management development programs conducted at Wittenberg College. He has presented several talks before meetings of the Steel Founders' Society.

William H. Shinn, chairman of the Northern Illinois-Southern Wisconsin Chapter of AFS, has been secretary, vice-chairman, and for four years was a director. Assistant sales manager of Gunite Foundries Corp., he has spent most of his business life at Gunite, having served a 4½-yr. foundry apprenticeship, followed by positions as assistant production manager and as sales engineer. His formal education beyond high school, interrupted by duty in the U. S. Naval Submarine Service for over two years, continues through extension and night courses.

Coal Processing Plant Applies Dust Control

There is an inkling of dust-free conditions to come in the foundry industry in the new plant, recently placed in operation by Penn-Rillton Co., which processes lump coal and coal tar pitch into fine pulverized foundry mold macing and core binder materials.

Foolproof interlocking automatic controls, explosion-proof motors and electrical equipment, and an all-inclusive dust control and collection system have been provided by The Austin Co., which designed the plant and processing installation in the interests of efficiency, economy and safety, as well as working conditions.

Because of the character of this equipment and the built-in flexibility of the materials handling system, maintenance and production personnel are limited almost entirely to the number required to man the bagging machines and to handle the finished product to and from storage or the shipping platform.

Lump Coal Principal Requirements

Lump coal and dry coal tar pitch are the principal raw materials required by the plant. These are received by rail from nearby mines and unloaded directly into the car hopper on the north side of the building. They travel on a belt conveyor to a single roll crusher, then are carried up to the top of the building by a bucket elevator. Passing through screw conveyors, the coal and pitch are delivered to their respective storage silos, of 100-ton capacity. They then pass through any of a number of combinations of pulverizers, screens, separators and other equipment, and are reduced minus 200 mesh or finer before they arrive at bagging machines on the main floor.

The combinations of equipment through which the materials pass are regulated according to the composition and grain sizes desired in the finished products. The coal and pitch are sometimes combined, in a number of proportions.

Because of the nature of the raw materials and products processed in the plant, a highly efficient dust collecting system was necessary. Yet the mass of equipment installed occupies remarkably little floor space.

The entire conveying and processing installation is completely enclosed and dust-tight. A negative pressure is maintained in the system by the dust collecting equipment, with one collector for pitch dust and one for sea coal dust. The collectors may be operated in combination or independently.

Dust collection in the plant has both physical and economic purposes. Its primary purpose is to eliminate the hazard of spontaneous combustion of dust-saturated air. At the same time, collecting dust improves working conditions in the plant. On the economic side, the dust is a valuable product in itself. It may be bagged and sold separately, or, more generally, blended with the other raw materials to obtain end products with various characteristics.

Obituaries

E. L. Shaner, 64, died November 10 of a heart attack. He was Chairman of the Board of Penton Publishing Co. since 1949. Mr. Shaner joined Penton in 1916 as editorial representative of Iron Trade Review and Foundry. In 1917 he became engineering editor of Iron Trade Review. After two years military service, 1917-19, he resumed work as engineering editor of Iron Trade Review (now Steel). He was made managing editor in 1925; editor, 1927; editor-in-chief, 1937. He was a director of the company since 1925 and president and treasurer from 1937 to 1949.

Mr. Shaner edited, or helped edit, the AFS Transactions from 1919 to 1923. He was also an honorary member of the AFS Alumni Group. Active in business paper journalism and publishing, he was past president of the National Conference of Business Paper Editors; director, National Publisher's Association, and past president of Associated Business Papers. He was chairman of the Business Press Industrial Scrap Committee and identified with a number of other wartime activity committees.

Mr. Shaner, as a member of the United States Reparations Commission, in 1946 completed a trip around the world, during which he inspected industrial plants in Japan, Korea, Manchuria, Formosa and Germany.

He was a member of American Foundrymen's Society, American Society Mechanical Engineers, Cleveland Engineering Society and Delta Upsilon fraternity.

Milton P. Schemel, superintendent of the finishing department of Symington-Gould Corp., Depew, N. Y., died of a heart condition recently. Although his continuous employment with the firm dates from 1924, he first joined the company in 1916. He worked as a helper, crane operator, crane repairman, inspector, assistant foreman, foreman and finally as superintendent.

Judge George W. Armstrong, founder of the Texas Steel Co. and Chairman of the Board, died in October.

Walter L. Potter, vice-president and sales manager of Atlas Foundry Co., Cleveland, died recently.

James Mitchell, formerly president of Grand Industries, Inc., then parent company of Cleveland Foundry Co. died recently.

Burr O. Fink, 70, president of Auburn Foundry Co., Auburn, Ind., died recently.

Herman H. Beidbreder, founder and president of Central Pattern Co., Quincy, Ill., died October 9.

Jack Ivory, executive vice-president of Hunter Douglas Corp., Riverside, Cal., died in an airplane crash October 7.

George P. Fisher, formerly with Whiting Corp., died recently at Ingalls Memorial Hospital, Harvey, Ill. At the time of his retirement in 1950 he was vice-president and director of personnel for Whiting, having held the position for the preceding four years.

Arthur J. Hiendel, 61, representative for the United States Graphite Co. in the Michigan territory, died unexpectedly at his home in Saginaw, Mich., recently. He joined the sales staff of U. S. Graphite in 1913 and served as a representative for their foundry products for 41 years.

George D. Ember, 64, died October 10 of a heart attack, in his home in Brooklyn, N. Y. He was in the foundry business since 1908. At the death of his father in 1945, he took over the Jefferson Brass Foundry with his brother William, forming the present partnership.

N. A. Ziegler, supervisor of metallurgical research for Crane Co. since 1936, died recently. He was well known for his research in vacuum fusion analysis of gases in metals, magnetic properties of iron, mechanical properties and structural characteristics of various alloy steels and cast irons. He, alone or with associates, published about 35 technical articles in connection with this work. He received the H. M. Howe Medal in 1935 from A.S.M. for one of these papers.

Foundry Trade Journal Moves

Effective October 25, the address of *Foundry Trade Journal*, British foundry publication, became John Adam House, 17/19 John Adam St., Adelphi, London, W. C. 2, England. Former address was 49 Wellington St., London, W. C. 2.

Schedule Southeastern Regional Conference

Plans for the Southeastern Regional Foundry Conference to be held at the Tutwiler Hotel in Birmingham, Ala., February 17-18, 1955, include for the first time in the history of the 23-year old meeting, a ladies program. In announcing the program, A. J. Fruchtl, United States Pipe & Foundry Co., Birmingham, listed sessions on molding practice and flask design, foundry costs, non-destructive testing and inspection, safety and hygiene and air pollution, shell molding, preventive maintenance, mechanization and material handling, and melting.

Technical sessions are scheduled for all day February 17 and the afternoon of the 18th, with the morning of the second day open for plant visits.

Program for the ladies is under the direction of Mrs. L. N. Shannon with Mrs. T. H. Benners, Jr., and Mrs. A. J. Fruchtl as co-chairmen. The ladies program includes luncheons, tours, and a fashion show.

For more data, circle No. 784, p. 17-18

For more data, circle No. 768, p. 17-18

Chapter Meetings

December

2 . . Saginaw Valley
Fisher's Hotel, Frankenmuth, Mich. Technical Meeting. H. H. Kessler, Sorbo-Mat Process Engineers, St. Louis, *"Factors Affecting the Quality of Castings."*

3 . . Western New York
Sheraton Hotel, Buffalo, N. Y., M. T. Rowley, Chief Metallurgist, Ohio Injector Company, Wadsworth, Ohio, *"Foundry Quality Control."*

3 . . Tri-State
Crystal Room, Mayo Hotel, Tulsa, Okla. Christmas Party

3 . . Texas
Student Memorial Center, College Station, Texas. Texas A & M College Student Meeting.

4 . . Northern Illinois-Southern Wisconsin
Faust Hotel, Rockford, Ill., Christmas Party.

4 . . Central Michigan
Annual Christmas Party

6 . . Western Michigan
Bill Stern's, Muskegon, Mich. Hyman Bornstein, *"Practical Metallurgy."*

6 . . Chicago
Chicago Bar Association, Chicago. Round Table Meeting. Gray Iron and Malleable Div. W. W. Levi, Lynchburg Foundry Co., *"Basic Cupola Operation."*

7 . . Rochester
Hotel Seneca, Rochester, N. Y., L. D. Richardson, National Supervisor of Sales and Service, Eutectic Welding Alloy Corp., New York, *"New Development in Foundry Welding."*

9 . . Northeastern Ohio
Carter Hotel, Cleveland, Ohio, Annual Christmas Party.

9 . . St. Louis
York Hotel, St. Louis, Mo., J. S. Schumacher, Chief Engineer, The Hill & Griffith Company, *"Foolproof Sand."*

10 . . Northern California
Shattuck Hotel, Berkeley, Calif. Casting Clinic.

10 . . Northern California
Christmas Party

10 . . Birmingham
Tutwiler Hotel, Birmingham, Ala., Mixed Dinner Meeting, members and their ladies, L. N. Shannon, vice-president, Stockham Valves & Fittings Co., Birmingham, *"Foundry Industry and the Part the AFS Plays Within the Foundry Industry."*

10 . . Ontario
Royal Connaught Hotel, Hamilton. 25-year Foundrymen's Night. Group Meeting. Gray Iron Division: J. E. Rehder, Canada Iron Foundries; E. Parker, Canadian General Electric Co., Ltd.; S. Whithard, Otaco Ltd., *"Recent Improvements in Cupola Practice."* Mal-

Chapter Meetings

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leable Division: R. A. Short, McKinnon Industries Ltd., *"Boron in Malleable Iron."* Non-Ferrous Division : D C. Sunnucks, Aluminum Co., of Canada Ltd., *"Aluminum from Mine to Foundry."*

10 . . Wisconsin
Schroeder Hotel, Milwaukee, Wis. Annual Christmas Party.

10 . . Eastern Canada
J. Hunt, Dominion Engineering Works, *"Foundry Costs."*

11 . . Quad City
Christmas Party

11 . . Southern California
Lakewood Country Club, Long Beach, Calif. Annual Christmas Party.

11 . . Twin City
Nicollet Hotel, Minneapolis. Christmas Party.

13 . . Timberline
Oxford Hotel, Denver, Colo. Christmas Party.

13 . . Michiana
Oliver Hotel, South Bend, Ind. Lawrence D. Pridmore, International Mold Machine Co., LaGrange Park, Ill., *"Tricks in Core Blowing."*

January

10 . . Michiana
Oliver Hotel, South Bend, Ind. National Officers' Nite. Ferrous Division: Sam S. Carter, American Cast Iron Pipe Co., Birmingham, Ala., *"Some Factors in Cupola Control."* Non-Ferrous Division: D. L. LaValle, Federated Metal Division, American Smelting & Refining Co., *"Making Better Aluminum Castings."*

10 . . Timberline
Oxford Hotel, Denver, Colo. C. C. Drake, manager, Griffin Wheel Co., *"Centrifugal Casting of Cast Iron."*

10 . . Western Michigan
Cottage Inn, Muskegon. Round Table Meeting and Old Timers' Get-together. A. W. Demmler, Campbell, Wyant & Cannon Foundry Co.; A. E. Jacobson, Jr., Grand Haven Brass Foundry; C. Locke, West Michigan Steel Foundry Co.; E. T. Price, Cadillac Malleable Iron Company.

13 . . Northeastern Ohio
Tudor Arms Hotel, Cleveland. Hans J. Heine, American Foundrymen's Society, *"AFS Research, Your Foundry's Silent Partner."*

14 . . Eastern Canada
Top Management Night. H. G. Robertson, manager, American Steel Foundries; W. W. Maloney, general manager, American Foundrymen's Society.

17 . . Quad City
Rex Jennings, superintendent, John Deere Waterloo Tractor Works, *"The Foundrys' Responsibility in Automation."*

22 . . Chesapeake
Alcazar, Baltimore, Md. Annual Oyster Roast.

Advertisers and their Agencies

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ESTIMATING ENGINEER to work for a growing precision investment casting company in southern New Hampshire. Would prefer training in this field, but any casting experience would be considered. Modern plant and equipment. Engineering degree desirable. Age range to 35 years. Write giving experience, education, age and salary requirements. **Box B67, AMERICAN FOUNDRYMAN, Golf and Wolf Roads, Des Plaines, Ill.**

NON-FERROUS FOUNDRY FOREMAN. Need man capable handling 16-man shop pouring bronze and aluminum. Located Midwest city of 250,000. Good chance for advancement. Will consider young man with high school education or better to train under present foreman scheduled to retire soon. **Box 68, AMERICAN FOUNDRYMAN, Golf and Wolf Roads, Des Plaines, Ill.**

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EARL E. WOODLIFF,
Foundry Sand Engineer.
Consulting . . . Testing.
14611 Fenkell (5-Mile Rd.) Detroit 27, Mich.
Res. Phone Vermont 5-8724

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FURNACES FOR SALE

10 used Heat Treating Furnaces, and two 7-ton gantry cranes, good condition, priced to sell.

BAER STEEL PRODUCTS, INC.
Box 1428
Boise, Idaho

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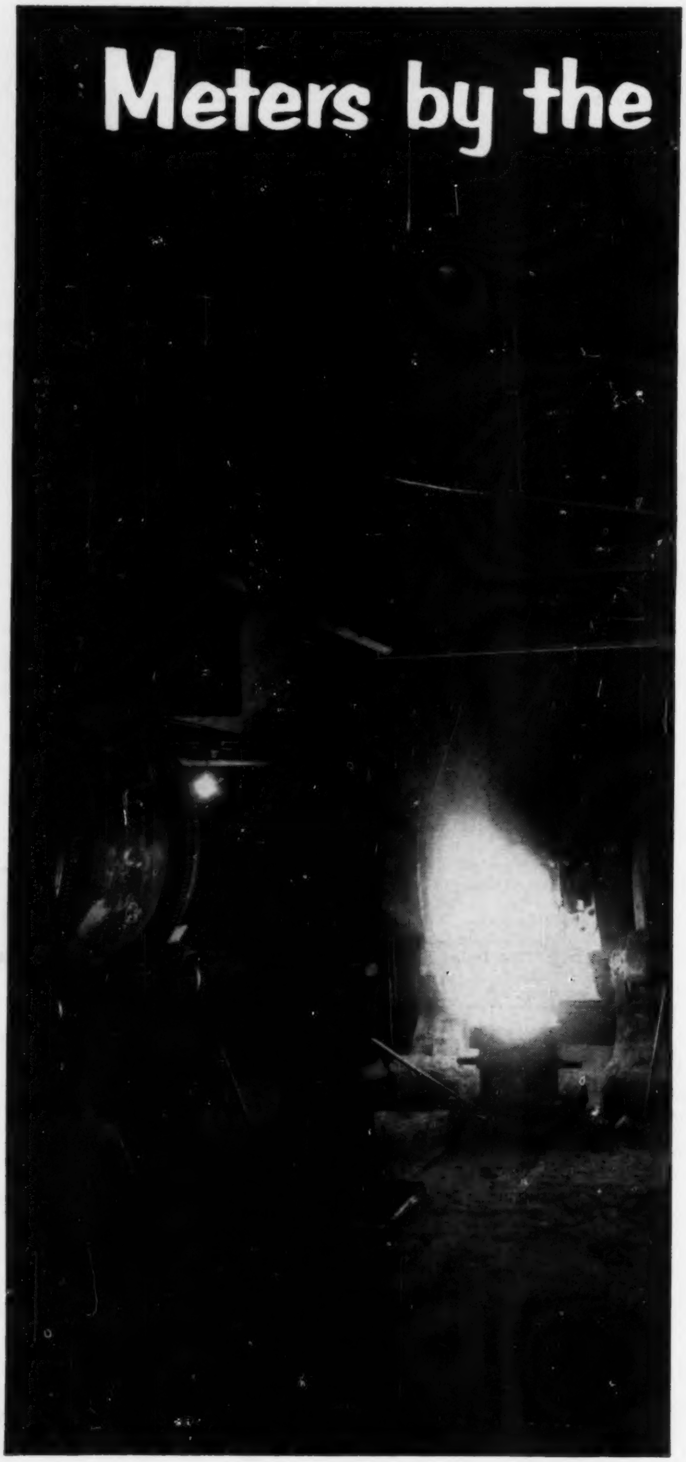
Meters by the millions...



from metal melted by

6 DETROIT ROCKING ELECTRIC FURNACES

Recently, the 11,500,000th Neptune meter was produced. This, like the bronze-cased Neptune meters for 30 years, was made from metals melted in a Detroit Rocking Electric Furnace.

The six DEF Furnaces in Neptune Meter Company's foundry are under constant pressure to meet production demands which call for hundreds of tons of melt per month. To meet quality standards, melts must be uniform, of exact analysis, and produced with economy and speed.

The indirect arc and controlled rocking action of Detroit Furnaces bring important advantages to production of both non-ferrous and ferrous melts. To learn how these advantages can benefit *your* foundry operations, let our engineers analyze your melting requirements. Write today!

DETROIT ELECTRIC FURNACE DIVISION

KUHLMAN ELECTRIC COMPANY • BAY CITY, MICH.

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MEMBER FEMA FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC.

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